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JOB COMPETENCIES, EMPLOYMENT DEMANDS, AND PERCEIVED TRAINING NEEDS IN PRODUCTION AGRICULTURE IN UTAH

by

James O. Summers

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Agricultural Education

UTAH STATE UNIVERSITY
Logan, Utah

1980

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James O. Summers

TABLE OF CONTENTS

ACKNOWLEDGMENTS ii

LIST OF TABLES v

ABSTRACT vii

INTRODUCTION 1

Purpose 1
Objectives 1

METHODOLOGY 2

REVIEW OF LITERATURE 5

RESULTS AND DISCUSSION 7

Findings 39

SUMMARY AND CONCLUSIONS 42

Purpose 42
Summary 42
Conclusions 43
Recommendations 45

REFERENCES 46

APPENDICES 47

Appendix A 48
Appendix B 59
Appendix C 71
Appendix D 83
Appendix E 95
Appendix F 107
Appendix G 119

LIST OF TABLES

Table		Page
1.	Participants' operation by size	8
2.	Distribution of respondents' by operation	9
3.	Beef breeds represented in the survey	10
4.	Dairy breeds represented in the survey	10
5.	Swine breeds represented in the survey	11
6.	Sheep breeds represented in the survey	12
7.	Poultry breeds represented in the survey	13
8.	Horse breeds represented in the survey	14
9.	Percentage of respondents' income earned through farming	15
10.	Number of full and part-time employees hired by respondents'	16
11.	Number of full and part-time additional employees hired by respondents	17
12.	Distribution of respondents' by age	18
13.	Participants' education level	20
14.	Respondents' job preparation for production agriculture	21
15.	Perceptions of farmers concerning the importance of competencies and training needs in personal employee attitudes and competencies	22
16.	Perceptions of farmers concerning the importance of competencies and training needs in maintaining equipment and vehicles	24
17.	Perceptions of farmers concerning the importance of competencies and training needs in constructing and maintaining buildings and structures	25
18.	Perceptions of farmers concerning the importance of competencies and training needs in marketing and shipping	26

LIST OF TABLES (Continued)

Table		Page
19.	Perceptions of farmers concerning the importance of competencies and training needs in selecting breeding and feeding stock	28
20.	Perceptions of farmers concerning the importance of competencies and training needs in maintaining herd health	29
21.	Perceptions of farmers concerning the importance of competencies and training needs in formulating feeds and feeding	31
22.	Perceptions of farmers concerning the importance of competencies and training needs in breeding and record keeping	33
23.	Perceptions of farmers concerning the importance of competencies and training needs in handling and caring for animals	35
24.	Perceptions of farmers concerning the importance of competencies and training needs in observing legal practices and following general safety precautions	37
25.	Perceptions of farmers concerning the importance of competencies and training needs in soil preparation, planting, irrigation and harvesting	38

ABSTRACT

Job Competencies, Employment Demands, and Perceived Training Needs in Production Agriculture in Utah

by

James O. Summers, Master of Science

Utah State University, 1980

Major Professor: Dr. Gilbert A. Long

Department: Agricultural Education

This study was limited to 165 farmers involved in various segments of production agriculture in the state of Utah. County agents and vocational agriculture teachers in each county nominated these farmers as candidates according to their respective farming operations.

The following six defined areas of production agriculture were used as selection criteria to insure equal input in the study: Beef, Dairy, Swine, Sheep, Poultry, and Crops. All farmers were surveyed by means of personal interviews conducted by either county agents or vocational agriculture instructors in their respective counties. The surveying instrument used was developed through a thorough review of the National Agricultural Competency Study list of skill questions. Farmers were asked to rank on a likert-type scale, the importance each skill had on their operation. Farmers were also asked to reply yes or no to whether or not they needed additional training in each skill area. Eleven categories of competencies were used in the study in an attempt to highlight all areas of production agriculture. Data were compiled and a Burroughs 6700 computer was utilized for program evaluation to

find means, rankings, ranges, and frequencies.

A review of the study revealed that:

1. Over one-third of all farmers surveyed terminated their formal education after high school. This places a great deal of emphasis on high school agriculture curriculum as well as adult education programs.

2. Many areas of production agriculture have overlapping areas of skills and competencies.

3. There is a commonality of competencies needed by all those entering the production agriculture industry.

4. Areas of animal health, equipment maintenance, soil preparation, and planting as well as legal practices and safety precautions, all placed very high in ranks of importance throughout the study.

5. Most employment figures are projected to remain relatively constant with a 10% or less fluctuation projected over a five-year period. The only exception is that of part-time non-family employees which shows a decrease of 18%.

6. One-hundred-ten of the one-hundred-fourteen competencies surveyed in the study were considered to be of some importance to the agriculture industry.

(130 pages)

INTRODUCTION

Purpose

The purpose of this study was to identify the currently needed skills in the area of production agriculture necessary for entry level employment. A definition of production agriculture is the production of a marketable product, such as food, fiber, meat or milk, for the use of man. This information is vital in keeping agricultural education up-to-date, and should prove very beneficial to vocational agricultural instructors in the state of Utah in evaluating and updating their core curricula for high school students in vocational agriculture. Additional data gained in the study will also aid county agents and vocational agricultural teachers alike in pinpointing areas of emphasis for adult training programs.

Objectives

The major objectives of this study were to determine:

1. the job skills needed in production agriculture
2. the present and perceived competency needs of those involved in the production agriculture industry
3. the manpower need trends in production agriculture

METHODOLOGY

A selected sample was taken from the entire population of farmers in Utah involved in production agriculture. This sample was identified by the local county agent and the vocational agriculture teacher in twenty-eight of the twenty-nine individual counties in Utah, Daggett County being the exception seeing as very few farms are located in that portion of the state.

When drawing the sample, each county agent and vocational agricultural teacher was instructed to provide the names and addresses of two farmers, preferably one large or corporate type farmer and one small or family type in each of the following areas in their county: dairy, beef, sheep, swine, poultry, and crops. These selected farmers were surveyed by means of a questionnaire developed from the National Agricultural Competency Study list of skill questions. Two basic questions were asked about each skill on the questionnaire:

1. How important is the skill to your operation?
2. Do you need more training in this area?

The responses were rated on a Likert-type scale of 0 to 4; 0 - does not apply; 1 - not important; 2 - of some importance; 3 - important; 4 - very important, and a yes or no to the question, "could you use more training in this area?"

The surveying instrument used in this study was developed from a review of literature and private consultation with specialists in plant and animal science at Utah State University and the county agents in the state. A similar tool was previously used in a study of the

beef cattle industry. However, significant changes in the general information sheet were made, expanding its capabilities to include production agriculture totally. The original questionnaire was field tested on a small sample of ranchers in Utah. After the aforementioned revision in application was made, it was again field tested with a small sample of farmers involved in production agriculture to check for clarity and completeness.

Data were collected through personal interviews conducted by county agents and agriculture teachers in each county. An information sheet accompanying the questionnaires cautioned the prospective interviewers against interviewer bias and leading questions. Other interviewing suggestions were also made on the instruction sheet to promote, as much as possible, a similar interview setting for each farmer surveyed.

As the surveying progressed, two follow-up letters were sent to interviewers at three week intervals to check on the number of interviews completed and to encourage completion of the interviewing task. Finally a telephone call was made to those interviewers not responding to the previous written reminders. Honorarium funds became available during the survey to help compensate interviewers for their time. This added incentive of six dollars honorarium per survey was stressed during each telephone conversation and a deadline for the completion of the surveys was established.

The general information cover sheet which accompanied each questionnaire contained such questions as type of farming operation; predominant breeds of livestock; number of full and part-time employees

hired; age of the operator and his educational level coupled with job preparation. It was felt that this additional information would provide some added insight into such areas as job preparation.

In the analysis of data collected, the computer was used to identify frequencies, means, and rankings for each of the skill areas surveyed. These data made available, possible skill areas needing training emphasis in order to keep teaching curriculum current with today's agricultural needs.

REVIEW OF LITERATURE

To the unfamiliar observer, the training of "farmers" may seem a relatively simple task. However, with the rapidly changing occupational structure of the nation due to automation and technology, one can see a definite need for a thorough and continuing analysis of jobs and their required training (Clary, 1965). Vocational education as we know it today, was created with the passage of the Smith-Hughes Act of 1917. Since that time, vocational agriculture instructors have been educating students for job placement in agricultural production and/or other agricultural related fields.

Many variables affect the establishment of curriculum in vocational agriculture. Before students can be adequately trained for particular areas of work, a basic knowledge of required job skills is necessary. These skills or competencies that are taught are usually considered by the vocational agricultural instructor to be the areas and units of highest importance (Lewis, 1970). The obvious problem with this means of evaluation is that what is important to the instructor may or may not be relevant to current trends in the agricultural industry or pertinent to local needs.

Another problem of recent years is the ever-increasing number of agricultural teachers entering the profession with little if any practical background in agriculture and a very limited amount of practical experience (Newcombe, 1976). These problems, coupled with many others, are evidenced by the extensive research that has been, and is currently being conducted in the area of assessing agricultural competency needs and job opportunities (Zurbrick, 1974).

Even if the vocational teacher had a broad-based agricultural background throughout his youth, he is faced with the dilemma of staying abreast of new innovations in his profession. With this in mind, periodic analysis of curriculum versus current agricultural demands should be conducted.

Assessing local needs of a particular geographic area has been a widely accepted practice in curriculum development for many years (Long, 1968). In spite of the success shown by this local survey approach, Groves (1976) found that many teachers still prepare their course curricula without the students' needs in mind. This type of curricula development is especially detrimental to students if teacher turn-over occurs frequently in a particular school. The variations in teaching techniques as well as curricula provide little continuity in the educational process.

To further complicate the development of a meaningful on-target agricultural curriculum, the Vocational Education Act of 1963 added still another dimension to agricultural education (McClay, 1976). The funding of agribusiness programs had a drastic impact on the agriculturally related instruction in vocational agriculture.

In summary, the field of Agricultural Education is a broad spectrum of related skills and competencies. To do justice to any one area or related group of skills, the agricultural teacher must identify specific tasks to be taught. It is the goal of this study to identify the pertinent areas of production agriculture needed to meet today's demands.

RESULTS AND DISCUSSION

Table 1 gives an indication as to the number and size of the respondents' operations. At the beginning of the study when the population was selected, care was taken to assure that an equal representation of both large and small operators were present. During the course of the surveying, however, various circumstances altered the equality of these figures slightly. Small problems were discovered such as some farmers no longer being in business, other individuals refusing to cooperate with the surveying effort, and finally some surveyors failing to send in all of the desired questionnaires. Despite these aforementioned surveying difficulties, 165 usable questionnaires were received of the 258 originally sent. This represents a 64% return with 89 farmers (53.9%) being large operators and 76 individuals (46.1%) being termed small operators.

When vocational agricultural instructors and county agents were asked to select large and small operators to be surveyed, the criteria for large and small was difficult to define. The only logical separation between the two appeared to be the small or family type farm versus the large corporate farm. During the compilation and analysis of the data, however, this writer discovered some obvious problems with the terminology "large" and "small". Operations considered as large in some surveyors' eyes, were termed as small by others and vice-versa. After discussing this problem with committee chairman, Dr. Gilbert A. Long, and research specialist, Dr. Walter Borg, it was felt best to use all the data in a general sense rather than try to differentiate

between large and small farmers. This eliminates some potentially interesting information but leaving it out will also avoid reporting any misleading or erroneous data. While random sampling was not used in this study, selection of large and small operators helped obtain more equal representation of farmers in Utah.

Table 1

Participants' Operation by Size

Size of Operation	Number	Percent Respondents
Large Operation	89	53.9
Small Operation	76	46.1
TOTALS:	165	100.0

The distribution of respondents surveyed according to six defined commodity groups in production agriculture are revealed in Table 2. In selecting farmers to be surveyed, this writer attempted to provide an equal representation in each area. As can be seen in the table, four of the six groups, beef, dairy, sheep and crops ranged from 30-36 respondents. Only two areas were somewhat unequal in representation. Swine production was slightly lower than most with 24 swine producers responding to the questionnaire. The lowest representation was that of poultry with 11. The problem evidenced in this particular category was that many counties in Utah do not have poultry operations, thus the lower number of respondents.

Responses from farmers surveyed revealed some interesting facts as to the predominant breeds of beef found in Utah as shown

Table 2

Distribution of Respondents by Operation

Operation	Number	Percent Respondents
Beef	36	21.8
Sheep	33	20.0
Crops	31	18.8
Dairy	30	18.2
Swine	24	14.5
Poultry	11	6.7
TOTALS:	165	100.0

in Table 3. The Hereford breed was very easily ranked number one with 68.5% of the beef operators indicating that breed as their choice. The category of crossbreds was ranked next with 12.5% of operators using this varied breeding method in their operations. Angus animals were placed third with a 10.2% response. The combined category of relatively new breeds namely Simmental and Limousin received a 4.5% rating. The remaining breeds surveyed; Beefmaster, Brown Swiss, Charlais, and Holstein, all received percentage rankings of just over 1%. The overwhelming percentage figures shown by the Hereford breed would indicate a significant point. In spite of the fact that new breeds are continually being introduced, it appears that farmers in Utah are not readily going to give up a productive, well-established breed. The reader is cautioned that random sampling was not used. Therefore, information received does not represent generalizable information.

Table 3

Beef Breeds Represented in the Survey

Beef Breeds	Number	Percent Respondents
Hereford	60	68.2
Crossbred	11	12.5
Angus	9	10.2
Simmental-Limousin	4	4.5
Beef Master	1	1.1
Brown Swiss	1	1.1
Charlais	1	1.1
Holstein	1	1.1
TOTALS:	88	100.0

Three dairy breeds are represented in Table 4. The most prevalent breed as indicated by 86% of all responding farmers was that of the Holstein. The second most popular breed in this category was Jersey with a 12% response. The remaining breed of dairy animal, that of the Guernsey was rated at only 2% response.

Table 4

Dairy Breeds Represented in the Survey

Dairy Breeds	Number	Percent Respondents
Holstein	43	86.0
Jersey	6	12.0
Guernsey	1	2.0
TOTALS:	50	100.0

In reporting the data in Table 5 on breeds of swine, the crossbred category ranks number one with nearly one-half of respondents choosing this breed variety for their operations. The Duroc breed placed second with 22.9%, closely followed by the breed of Yorkshire with a rating of 20%. The remaining breeds of Hampshire, Chesterwhite, and Landrace, received responses of less than 6.0%. Although the three aforementioned breeds appear relatively insignificant percentage-wise, it should be noted that they are probably all being used to some extent in the crossbred operations.

Table 5

Swine Breeds Represented in the Survey

Swine Breeds	Number	Percent Respondents
Crossbred	16	45.7
Duroc	8	22.9
Yorkshire	7	20.0
Hampshire	2	5.7
Chesterwhite	1	2.9
Landrace	1	2.9
TOTALS:	35	100.0

One third of all sheepmen surveyed indicated that the Columbia breed was the common one to their operations as shown in Table 6. Crossbred varieties and the Suffolk breed followed next in rank both with 20.8% ratings. The Rambouillet breed received 14.6% of the sheepmens' responses, whereas the remaining three categories of

mixed breeds, Targhee, and Hampshire were rated at less than 5%. Although the last three breed categories received fairly insignificant percentage ratings, it is well to note that all three are no doubt used to some extent in the crossbred operations.

Table 6

Sheep Breeds Represented in the Survey

Sheep Breeds	Number	Percent Respondents
Columbia	16	33.3
Crossbred	10	20.8
Suffolk	10	20.8
Rambouillet	7	14.6
Mixed	2	4.2
Targhee	2	4.2
Hampshire	1	2.1
TOTALS:	48	100.0

The majority of poultry farmers surveyed use the Leghorn breed in their operations as revealed in Table 7. Dropping considerably in percentage rank were the Shaver breed and the Rhode Island Red, both with 6.9%. Finally, the remaining breeds of American Highline, Bantam, and New Hampshire Red, all received equal rankings of 3.4%.

Some interesting information on the population of various breeds of horses in the state of Utah is found in Table 8. The quarter horse was by far the most common as indicated by 63.3% of

Table 7

Poultry Breeds Represented in the Survey

Poultry Breeds	Number	Percent Respondents
Leghorn	22	76.0
Shaver	2	6.9
Rhode Island Red	2	6.9
American Highline	1	3.4
Bantam	1	3.4
New Hampshire Red	1	3.4
TOTALS:	29	100.0

the farmers surveyed. Ranking second was the category of unknown breeds with 27.8%. This would reveal that many farmers keep horses either for work or pleasure riding with little thought as to the specificity of the breed. The remaining four breeds; Crossbred, Morgan, Shetland, and Thoroughbred, all received rankings of 1.3% to 2.5%. Horses were not considered as a specific commodity group in this study because of the relatively low number of totally horse oriented operations in the state. However, horses are considered a vital part to many other areas of production agriculture and therefore, we thought it appropriate to report the information that was discovered through the cover sheet questions.

The percentage of income farmers earned through farming provides some very predictable figures for the population surveyed as shown in Table 9. The overwhelming majority of farmers, 111 of 165

Table 8

Horse Breeds Represented in the Survey

Horse Breeds	Number	Percent Respondents
Quarter	50	63.3
Unknown	22	27.8
Crossbred	2	2.5
Morgan	2	2.5
Shetland	1	1.3
Thoroughbred	1	1.3
TOTALS:	79	100.0

surveyed (67.3%) fell in the 80-100% income through farming category. These figures should be expected considering the fact that the farmers nominated for survey by county agents and vocational agricultural teachers are some of the more successful operators in each county. The income figures between the 71-80% category to 11-20% have only a few respondents in each category. The lowest income group surveyed 1-10% had 15 respondents (9.1%). It should be noted that these individuals were farming part-time and were selected as "small farmers".

Information relative to the use of family employees in production agriculture operations is found in Table 10. Full time family employment figures show only slight variation. Two years ago, .95 employees were hired figuring an average of about one full-time employee per operation. At present, these figures have increased

Table 9

Percentage of Respondents Income Earned Through Farming

Percent Income	Number	Percent Respondents
0-10	15	9.1
11-20	8	4.8
21-30	6	3.6
31-40	3	1.8
41-50	6	3.6
51-60	3	1.8
61-70	2	1.2
71-80	11	6.7
81-100	111	67.3
TOTALS:	165	100.0

8.7%, giving an average of 1.04 employees used by each operator. For two years in the future, the farmers surveyed again projected an average of .95 employees, which would show a 8.7% decrease in employment figures for family members. This decrease would bring the demand of employees in this category back to the original starting point of two years past. In summary, over a five year period, farmers feel there will be less than a 10% change either up or down in this area.

Table 10 also reveals data pertinent to the category of part-time family employment. Figures for two years ago show an average of 1.37 family-member employees working part-time. Today, these figures are only 2.1% higher standing at 1.40 employees. Two years in the future, farmers project another increase of 2.8% bringing the employment average

in this category to 1.44 employees per operation. In summarizing this segment of the data, farmers indicate that there will be a 5% or less variation in total numbers of part-time family employees over a five year period.

Table 10

Number of Full and Part-time Family Employees Hires by Respondents

When Employed	Average Number Full Time	Average Number Part Time
Two Years Ago	.95	1.37
At Present	1.04	1.40
Two Years in the Future	.95	1.44

Employment data for individuals hired, who are not family members, is revealed in Table 11. The full-time employemnt figures in this area show that an average of .71 employees were being used by each operator two years ago. Today these figures have increased 8.9% to a level of .78 employees per operation. A projection two years in the future shows only a 1.3% increase or .79 employees. In summary, farmers expect about a 10% variation in employee numbers over a five year period.

The final category of employee consideration was that of part-time non-family employees. Two years ago, farmers used an average of 2.26 such employees per operation. At present, this total has decreased 2.2% to a level of 2.21 employees. Projecting two years into the future, figures show an 18.1% decrease in this area. This drastic

decrease has probably been caused by a combination of two factors. Number one is the fact that many farmers are turning to more automated hay handling systems. Bale wagons, large round balers and green haylage systems are eliminating the need for additional part-time employees during previous high labor periods. A second possibility indicated by some farmers was that with today's economy the way that it is, they just can not afford the luxury of as many hired men.

Table 11

Number of Full and Part-time Non-family Employees Hired by Respondents

When Employed	Average Number Full Time	Average Number Part Time
Two Years Ago	.71	2.26
At Present	.78	2.21
Two Years in the Future	.79	1.81

Some interesting data as to the ages of the farmers surveyed in this study are found in reviewing Table 12. Individuals seventeen to eighty-two years of age contributed information through the personal interviewing effort. The average age of the farmers surveyed was 47.43 years. The mode, or most frequently occurring age was 46 years. The age of 46 may be slightly higher than it would have been if the sampling had been done on a totally random basis. Inasmuch as farmers nominated for the survey were to be considered experienced in their respective operations, this could have influenced the vocational agricultural teachers and county agents to select older individuals. It should also

be noted in this table that one respondent in the survey failed to list his age, therefore, only 164 farmers are reported, yielding a 99% response rate.

Table 12

Distribution of Respondents by Age

Years of Age	Number	Percent Respondents
17-30	15	9.0
31-40	39	23.7
41-50	48	29.0
51-60	33	19.9
61-70	20	12.0
71-82	9	5.4
TOTALS:	164	99.0

Mean 47.43
Mode 46.00
Range 17-82 years

Pertinent data as to the educational level of those individuals surveyed is highlighted in Table 14. The category of high school training claimed the largest number of respondents with 54 (32.9%). The next highest response was for training two years post high school with 36 farmers (22.0%). The bachelor's degree figures followed closely the aforementioned data with 32 respondents (19.5%) indicating that they had completed requirements for a four-year degree. Twenty-four farmers (14.6%) had also completed just one year of training at a post-secondary level. Of the remaining individuals surveyed, only

five farmers (3.0%) had completed a master's program and a total of thirteen people (7.9%) had failed to complete a high school level education. At a glance, it can be seen that the vast majority of nominees surveyed were clustered in the educational levels of high school through bachelors degree. This writer feels that this educational data provides a very important focus for the study. Where the majority of farmers interviewed only attained a high school education, then the responsibility of providing on-target training geared to entry level employment lies with the vocational agricultural instructor. An additional area worth emphasizing is the one and two year post high school programs. Many farmers during the course of the interviews, communicated the fact that a four year degree did not seem appropriate for them while they were attending a university, so they dropped out and returned to the farm. This critical educational need has been sensed by certain universities, and at present, many two-year vocational programs are being offered to bridge this training gap.

A distribution of respondents as to their preparation for work in production agriculture is shown in Table 14. It should be noted that nominees were asked to select the educational means they felt most influential in their job preparation and therefore, some figures will not coincide directly with Table 13. An example of this would be a farmer having completed high school and yet when choosing a training category, he may have selected on-the-job training.

This table places employment preparation emphasis on three main areas, the first being that of college or university training with 48.2% of respondents selecting this category. It was indicated in Table 13, however, that only 19.5% of individuals finished their

Table 13

Participants' Education Level

Highest Grade Completed	Number	Percent Respondents
8 or less	0	0
9	0	0
10	8	4.9
11	5	3.0
12	54	32.9
13	24	14.6
14	36	22.0
B.S.	32	19.5
M.S.	5	3.0
PhD	0	0
TOTALS:	164	100.0

four year degree. High school training ranked next in priority with 50 respondents (30.5%) terminating their formal training at grade twelve. On-the-job training claimed 27 respondents (16.5%). These figures again point to a key educational area in which training emphasis should be concentrated. High school and two year post high school seem to be the two more common denominators with the majority of farmers interviewed. This would again reinforce the need for specific skill oriented training in vocational agricultural classes and also point many students toward a two year vocational program rather than a four year academic degree.

Table 14

Respondents' Job Preparation for Production Agriculture

Preparation	Number	Percent Respondents
College or University	79	48.2
High School	50	30.5
On-the-Job Training	27	16.5
Veterans' Program	3	1.8
Other	3	1.8
Adult Education	2	1.2
TOTALS:	164	100.0

The perceptions of farmers concerning the importance of competencies and training needs in their employees are summarized in Table 15. Receiving top rating in this area was the skill of demonstrating a willingness to work. All of the skills surveyed in this area were ranked from 2.84 to 2.47 indicating a moderate concern for attention in this category. A 0-4 scale of importance was used.

As for farmers themselves needing additional training in employee relations, most felt little need. With a range of only 22.4% - 27.3% of those surveyed indicating a need for training in this area, it is felt that emphasis in other skill areas would be more appropriate in meeting adult training needs.

The perceptions of farmers concerning maintenance of equipment and vehicles are revealed in Table 16. The rank of importance ranges between 3.29 indicating a score of important or higher, down to a low

Table 15

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Personal Employee Attitudes and Competencies

Skills	Mean*	Percent Needing Training
Demonstrate a willingness to work	2.84	26.1
Demonstrate an ability to work on his own	2.80	25.5
Demonstrate the ability to get along with others	2.56	23.0
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	27.3
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	22.4

$\overline{X}$ = 2.64

*rated on an importance scale of 0 - 4

of 2.76 which is still near the important level of 3.0. The areas of upmost concern in this category were lubrication maintenance with a score of 3.29, inspecting equipment for defects, with a score of 3.23, followed closely by servicing air cleaners and cooling systems, with scores of 3.20 and 3.18 respectively. The remaining eight maintenance areas received rankings of 3.14 down to a low of 2.76 which is still near the important level of 3.0. These high scores would indicate that maintenance is an area of primary concern to farmers.

Farmers themselves also expressed a desire for training in this

area. Of those surveyed, 51.5% indicated ignition systems and tune-up was an area in which they needed training. Supplemental training was also needed by 44.2% in electric motors. Receiving a 42.4% rating was an expressed need in the maintenance of fuel systems. The remainder of the skills listed received responses from 40.0% down to a low of 26.7%. An overall summation in this area would indicate that all aspects of maintenance are deemed important to farmers with some areas being stressed over others.

The ratings for constructing and maintaining buildings are given in Table 17. Constructing and maintaining gates and fences received the highest ranking of 3.03 with electrical wiring maintenance closely following with a rank of 2.84. The remaining seven areas were ranked between 2.80 and 1.76. Concrete work and laying brick and block were the lowest ranked skills in this category with scores of 2.24 and 1.76 respectively.

The majority of farmers surveyed, (59.4%) indicated a definite need for training in the area of electricity and related equipment. Help was requested in the skill areas of arc and acetylene welding and building construction by 48.5% of those individuals surveyed.

Interestingly, the skill area receiving lowest rank percentage-wise with farmers for needed training, was that of repairing fences, gates, etc. with a score of 29.1%. That was the same skill that farmers felt entry level employees needed most help in with a rank score of 3.03.

The perceptions of farmers concerning the marketing and shipping of livestock are summarized in Table 18. As for entry level employment skills, only two received ranks of 3.0 or higher with market selection

Table 16

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Maintaining Equipment and Vehicles

Skills	Mean*	Percent Needing Training
Maintain lubrication systems (oil, filters, grease)	3.29	32.7
Inspect equipment for operating defects	3.23	40.0
Service air cleaners	3.20	28.5
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	35.8
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	42.4
Install and adjust belts and chains on equipment	3.06	30.3
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	51.5
Repack and replace bearings and seals	2.98	35.8
Prepare equipment for storage	2.94	37.6
Install and service battery	2.89	26.7
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	44.2
Replace universal joints	2.76	37.6

$\overline{X}$ = 3.05

*rated on an importance scale of 0 - 4

Table 17

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Constructing and Maintaining Buildings and Structures

Skills	Mean	Percent Needing Training
Construct and repair fences, gates, doors and pens	3.03	29.1
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	59.4
Replace valves in water system and replace water pipe	2.80	35.8
Adjust, recondition, sharpen, and store tools	2.78	36.4
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	48.5
Building construction (framing, siding, roofing, etc.)	2.53	48.5
Apply wood and metal preservatives	2.53	33.9
Mix, cast, finish, and cure concrete, build and remove forms	2.29	41.8
Lay brick and block	1.76	38.8

$\overline{X} = 2.59$

*rated on an importance scale of 0 - 4

ranking 3.14 and interpreting market reports following with 3.01. The remaining six skill areas received ranks of 2.95 down to calculating shrinkage with a rank of 2.67.

Definitely the most interesting information gained in this segment of the study was that referring to the farmers themselves. Five of the eight skill areas surveyed listed ratings of 54.5% or greater. The highest was a 61.8% figure concerning the analysis of market cycles. The overwhelming majority of farmers surveyed in this entire category felt a need for additional support and training in the marketing and shipping of their livestock.

Table 18

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Marketing and Shipping

Skills	Mean*	Percent Needing Training
Select market	3.14	54.5
Interpret market reports	3.01	54.5
Analyze market cycles	2.95	61.8
Determine when animals are ready to market	2.85	35.2
Sort animals according to size and weight	2.76	32.7
Select appropriate marketing system (futures, contracts, etc.)	2.72	57.6
Identify characteristics of USDA grades	2.70	54.5
Calculate shrinkage	2.67	40.0

$\overline{X}$ = 2.85

*rated on an importance scale of 0 - 4

The perceptions of farmers surveyed concerning the selection of breeding and feeding stock indicate that they place a great deal of importance on evaluating general conditions of animals as shown in Table 19. This skill rated an importance level of 3.16. Following closely the previous rank was the selection of foundation or replacement stock with a rank of 3.15. The establishment of production goals for culling and the use of individual production records were next with scores of 3.12 and 3.09 respectively. The remainder of the six skills surveyed in this category fell between scores of 3.01 - 3.65 with the lower score being that of evaluating the influence consumer demand has on the type of animal to select.

The farmers themselves expressed a desire for additional training in the following areas: Two skills receiving a majority of farmers' votes were evaluating various traits and characteristics inherited, along with selecting a breeding system to follow (cross breeding, line breeding etc.) with ratings of 53.9% and 50.3% respectively. An interesting note in this category is that farmers place the highest rank for entry level employment training a score of 3.16 on the same skill that they placed lowest for their own needs, a 36.4% figure on the skill of evaluating the general conditions of animals.

The perceptions of farmers concerning the importance of competencies and training needs in maintaining herd health are revealed in Table 20. The majority of skills for entry level employment training were ranked between 3.11 and 3.39 with identification of common disease symptoms ranking highest. Vaccination methods and control of common diseases ranked next, with scores of 3.32 and 3.28 respectively. The remaining five skills, although below the 3.0 level of importance, were still very

Table 19

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Selecting Breeding and Feeding Stock

Skills	Mean*	Percent Needing Training
Evaluate general conditions of animals	3.16	36.4
Select foundation or replacement stock	3.15	49.1
Establish production goals for culling purposes	3.12	48.5
Keep individual production records	3.09	46.7
Inspect animals for desirable traits, characteristics, and defects	3.01	49.7
Evaluate the degree various traits and characteristics are inherited	2.92	53.9
Keep and evaluate various traits and characteristics and defects	2.86	45.5
Identify and evaluate advantages of various breeds	2.86	43.6
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	50.3
Evaluate influence of consumer demand on type of animal to select	4.65	39.4

$\overline{X} = 2.97$

*rated on an importance scale of 0 - 4

Table 20

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Maintaining Herd Health

Skills	Mean*	Percent Needing Training
Identify symptoms of common diseases	3.39	66.1
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	43.6
Select appropriate method to control diseases	3.28	61.2
Identify and control internal and external parasites	3.25	60.0
Identify symptoms of nutritional imbalance	3.24	66.1
Interpret labels on medications and insecticide containers	3.18	47.9
Identify sanitation problems which may affect the herd health	3.12	50.9
Isolate animals with transmissible diseases and/or injuries	3.11	39.4
Work with veterinarians in developing herd health program	2.94	52.7
Calculate cost of treatments	2.89	48.5
Apply medication to cuts and bruises	2.89	38.8
Supply medication through feed and water	2.75	46.7
Use insecticide repellants in buildings	2.69	50.3

$\overline{X}$ = 3.08

*rated on an importance scale of 0 - 4

highly ranked with scores of 2.69 - 2.94.

The items receiving the most attention in this table, however, should be those of the expressed adult training needs. The majority of farmers indicated a need for training in 7 of the 13 skills. Percentages in this area ranked second highest in the overall study with 66.1% being the top score. Two skills received the aforementioned percentage, those of identifying symptoms of common diseases and symptoms of nutritional imbalance. Following next in order of importance were appropriate methods of disease control with a score of 61.2% and parasite control with a score of 60.0%. The remaining nine skills ranged from 52.7% - 39.9%. In this chart, the entry level employment and adult training needs were more closely related. The area of common disease symptoms was ranked top in both cases and other skills were distributed with much the same similarity.

The perceptions of farmers concerning the importance of competencies and training needs in formulating feeds and feeding are highlighted in Table 21. Determining and balancing rations for livestock were the skills receiving the top rating of 3.11. Closely following this top ranked skill was cost calculations of rations at 3.09 and identifying factors influencing feed quality with a score of 3.04. The next seven skill areas were not far below the 3.0 level of importance with scores ranging from 2.80 - 2.99. This would indicate that perhaps feed rations should receive an ample amount of emphasis in classroom instruction. The remaining five skills were ranked 2.38 - 2.69 with preconditioning of animals for feedlots or shipping receiving the lowest rating.

As for farmers themselves, the majority of those surveyed indicated

Table 21

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Formulating Feed and Feeding

Skills	Mean*	Percent Needing Training
Determine and balance rations for livestock	3.11	57.6
Calculate cost of rations and feed mixtures	3.09	55.2
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	49.7
Calculate feed efficiency	2.99	57.6
Evaluate the influence the quality of feedstuffs has on the production	2.96	51.5
Determine appropriate form and prepare feed mixtures	2.92	52.1
Evaluate how ration imbalance may affect production	2.91	55.2
Determine how feed palatability may be improved	2.87	57.0
Substitute for various feedstuffs in rations	2.82	51.5
Interpret feed tags and labels	2.80	43.0
Interpret feed analysis reports (to have your feed analyzed)	2.69	52.1
Determine when feed additives should be withdrawn from animals (antiobiotics stilbestrol, etc.)	2.52	34.5
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	38.8
Determine water requirements for animals	2.48	30.9
Precondition animals for feedlot or shipping	2.38	35.2

$\overline{X}$ = 2.80

*rated on an importance scale of 0 - 4

a desire for more training in nine of the fifteen listed skills. The skills receiving the highest priorities in this category were determining and balancing rations and calculating feed efficiency, both with scores of 57.6%. Determining feed palatibility followed next with 57.0%. Finally, cost of rations and effects of ration imbalance were given scores of 55.2%. The remaining ten skills placed between 52.1% and a low of 35.3%. In this particular area of concern, the items stressed for entry level employment training very closely paralleled those that farmers requested for their own needs. The top ranked skill of balancing rations and the lowest ranked one concerning preconditioning of animals were placed identically by farmers regarding their own perceived training needs.

The perceptions of farmers concerning the importance of competencies and training needs in breeding and record keeping are shown in Table 22. All eight skills in this area were ranked below the 3.0 level of importance. The highest priority of 2.89 was marking animals for identification. Identification of various causes of breeding difficulty was second with a 2.87 score. The remaining scores decreased from 2.63 to 1.86 with the lower score being assigned to the registering of animals.

The majority of farmers indicated only one area of real concern, that being the identification of various causes of breeding difficulty with 52.9% desiring training. The remaining seven skills were rated significantly lower with scores of 27.9% down to 19.4%.

The perceptions of farmers concerning the importance of competencies and training needs in handling and caring for animals are summarized in Table 23. This table, similar to Table 22, has a relatively low

Table 22

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Breeding and Record Keeping

Skills	Mean*	Percent Needing Training
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	25.5
Identify various causes of breeding difficulty	2.87	52.7
Select a breeding method (pasture, AI, etc.)	2.63	27.9
Record day of birth	2.45	20.6
Determine number of males needed for brood herd	2.36	17.6
Record weaning weight	2.19	19.4
Use artificial insemination	2.07	26.7
Register animals	1.86	21.2

$\overline{X}$ = 2.42

*rated on an importance scale of 0 - 4

priority placed on skill rankings. As for entry level employment training, only two items were placed above or close to the importance level of 3.0. Assisting animals in delivering young was placed highest with a score of 3.09. The castration and docking of animals was placed next with 2.98 being the score. The remaining 11 skill items were rated 2.77 through 1.55 with the lower score representing the fitting and showing of animals. This score of 1.55 also happens to be the lowest rated skill area in the entire study.

Figures indicating training needs for farmers were also somewhat lower in this table. The two items receiving top rank were evaluating the influence of stress on growth and condition of animals at 43.6% and assisting animals in delivering young with 41.8%. The remaining 11 skills had values ranging from 32.1% to 17.6%.

It is important to again note that the lowest score in this area and in the entire study was that of fitting and showing animals. This input may be of interest to vocational agricultural instructors and county agents alike when considering points of importance in the production of show animals for local fairs. Despite the fact that animals must be fit and prepared for fairs and shows, actual importance in the industry itself is considered minimal.

Identifying and correcting potential safety hazards tops the list of importance in Table 24 observing legal practices and following general safety precautions. The aforementioned skills received a rank of 3.33, well above the 3.0 criteria or important level. Four other skill areas also placed above this level. Properly storing and disposing of chemical and inflammable materials was rated second with a score of 3.24. Reading and understanding information on labels and signs placed next with 3.23. Following laws relating to chemical usage received 3.22 and finally appropriate protective clothing placed fifth with 3.06. The remaining four skill areas surveyed fell between 2.99 and 2.56. The lowest ranking skill item for entry level employment was knowing and following the Environmental Protection Agency's (E.P.A.) regulations which apply to general farming operations.

In reference to adult training needs, only one skill was requested by the majority of farmers surveyed. The majority of farmers (54.5%)

Table 23

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Handling and Caring for Animals

Skills	Mean*	Percent Needing Training
Assist animals in delivering young	3.09	41.8
Castrate and dock animals	2.98	29.1
Remove manure from quarters and spread it on fields	2.77	18.2
Evaluate influence of stress on growth and condition of animals	2.75	43.6
Dehorn animals	2.61	27.3
Remove dead animals	2.61	16.4
Determine space needed for animals	2.51	23.6
Isolate newly purchased animals for observation	2.44	23.0
Bed animals	2.40	18.2
Trim hoofs	2.19	32.1
Control waste runoff from feedlots	2.14	21.8
Move feeder animals into proper feedlots	1.98	17.6
Fit and show animals	1.55	20.6

$\overline{X} = 2.46$

*rated on an importance scale of 0 - 4

requested training in following laws relating to chemical usage. Identifying and correcting potential safety hazards was close to a majority rating with 49.7%. Finally, knowing and following E.P.A. regulations which apply to farming also rated a near majority with 49.1%. The remaining six skill areas were rated between 42.4% and 33.4%.

It is interesting to note that the skill dealing with E.P.A. rules and regulations was lowest in rank for entry level employment training. Farmers, however, must feel more responsible to have a knowledge of these rules and regulations as indicated by their relatively high percentage score in this area. Farmers do differentiate between their own management responsibilities and the responsibilities of entry level employees.

The perceptions of farmers concerning the importance of competencies and training needs in soil preparation, planting, irrigation and harvesting identifies many skill areas of particularly high rank as shown in Table 25. Figuring which fertilizer, how much, and when to apply, tops the list with a rank of 3.26. Next in order of importance is knowing the various methods of weed control with 3.22 and seedbed preparation at 3.16. Six other items placed above the 3.0 level of importance indicating a great emphasis on this total category. Only three remaining skills placed below the 3.0 level and their rankings were still above 2.5.

Without a doubt, farmers requested more training emphasis in this category of the survey than in any other. In two skills, over 70% of those surveyed indicated a need for training. Knowing the various methods of weed control, headed the list with 72.7% followed by understanding proper fertilizer use, with 70.9%. Four topics

Table 24

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Observing Legal Practices and Following General Safety Precautions

Skills	Mean*	Percent Needing Training
Identify and correct potential safety hazards	3.33	49.7
Properly store and dispose of chemical and inflammable materials	3.24	42.4
Read and understand information on labels and signs	3.23	42.4
Follow laws relating to chemical usage	3.22	54.5
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	40.6
Conveniently locate fire extinguishers in buildings and on equipment	2.99	41.2
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	42.4
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	33.9
Know and follow EPA regulations which apply to general farming operations	2.56	49.1

$\overline{X}$ = 3.00

*rated on an importance scale of 0 - 4.

Table 25

Perceptions of Farmers Concerning the Importance of Competencies and Training Needs in Soil Preparation, Irrigation and Harvesting

Skills	Mean*	Percent Needing Training
Figuring which fertilizer, how much, and when to apply	3.26	63.6
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	72.7
Preparing seed bed for planting	3.16	43.0
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood, etc.)	3.13	54.5
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	70.9
Knowing the strong and weak points of various crop varieties	3.10	68.5
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	60.0
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	55.8
Understanding the value of crop rotation	3.03	46.1
Utilizing soil test information	2.92	61.2
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	57.6
Identify and correct specific field drainage problems	2.65	41.8

$\overline{X}$ - 3.04

*rated on an importance scale of 0 - 4

received ratings of 60% or higher, three were rated at 50% or more and even the remaining two had a minimum of 40% plus. These figures should provide some useful information to both educators and county agents in planning the high school curriculum and future adult short courses. It is quite possible that recent high fertilizer costs, coupled with the latest E.P.A. chemical usage laws have caused farmers to indicate obvious concerns in this area.

Findings

Of the 114 competencies surveyed, 41 were rated 3.0 - 4.0 in rank. This would indicate that 36% of all competencies in the study were found between the criteria levels of important and very important. An additional 64 skills (56%) were listed within the 2.0 - 3.0 range of some importance to important. Only four remaining competency areas (3.5%) were rated below the criteria level of some importance.

The five most important individual competencies for all major categories were: (1) Identifying symptoms of disease, (2) Identifying and correcting potential safety hazards, (3) Vaccinating animals, (4) Selecting appropriate methods to control disease, and (5) Maintaining lubrication systems, (oil, filters, grease, etc.). It is interesting to note that three of the five top rated skills were in the category of maintaining animal health.

In addition, other highly rated competencies found in production agriculture were: (1) Evaluate the general conditions of animals (2) Figuring which fertilizer to use, how much, and when to apply, (3) Identify and control internal and external parasites, (4) Identify symptoms of nutritional imbalance, (5) Properly store and

dispose of chemical and inflammable materials, (6) Read and understand information on labels and signs, (7) Inspect equipment for operating defects, (8) Following laws relating to chemical usage, (9) Service air cleaners, and (10) Maintain cooling systems (coolant, leaks, thermostats, hoses).

The four skills rating lowest in the study were: (1) Moving feeder animals into proper feedlots, (2) Registering animals, (3) Laying brick and block, and finally, (4) Fitting and showing animals. It is interesting to note that farmers rated the skill of fitting and showing animals lowest of all competencies in the entire study. This would indicate that areas of prime concern to vocational agricultural teachers and students are not always equal to the corresponding segment of the production agriculture industry.

The survey of various breeds of animals yielded the following information as to the prevalent breeds found in Utah: (1) Beef/ Hereford, (2) Dairy / Holstein, (3) Sheep/Columbia, (4) Swine/Crossbred, (5) Poultry/Leghorn, and (6) Horses/Quarter.

The average number of full-time family employees hired two years ago was .95. At present it stands at 1.04 employees per operation indicating an 8.7% increase. Projecting two years in the future it is expected to again drop to .95 which would signify very little change over a five year period. Average figures for part-time family employment, however, was 1.37, at present it reads 1.40, and two years from now it is expected to be 1.44 employees per operation showing a steady increase of 5% over a five year period.

As for full-time non-family employees hired, two years ago the average number of such employees per operation was .71. At present

figures stand at .78 and in two years, numbers are projected up only slightly to .79. Numbers of non-family employees working part-time show the greatest variation in the employment category. Two years ago, an average of 2.27 non-family employees were hired by each operator on a part-time basis. Presently the figures stand at 2.21 and two years from now they are expected to drop to 1.81 showing an 18% decrease over a five year period.

The average respondent surveyed in the study was 47 years of age and the majority (54) had received no post-high school training. Most farmers interviewed (111 or the 165) earned 81-100% of their income through a farming operation.

SUMMARY AND CONCLUSIONS

Purpose

The purpose of this study was to identify the currently needed skills in the area of production agriculture necessary for entry level employment. This information is vital in keeping agricultural education up-to-date, and should prove very beneficial to vocational agricultural instructors and county agents in the state of Utah. Inasmuch as high school curricula needs to be constantly updated and adult training needs met, this study should provide some on-target information for both areas of emphasis.

Summary

A selected sample for this study was nominated by local vocational agricultural instructors and county agents in twenty-eight of the twenty-nine counties in Utah, Daggett county being the exception. These individuals were requested to submit the names of two farmers in each of the following six defined areas of production agriculture: beef, dairy, swine, sheep, poultry, and crops. Farmers were asked to rate 114 job competencies as they perceived the individual importance of each in reference to their own farming operations. The following eleven categories of competencies were used in the study: (1) personal employee attitudes and competencies, (2) maintaining equipment and vehicles, (3) constructing and maintaining buildings and structures, (4) marketing and shipping, (5) selecting breeding and feeding stock, (6) maintaining herd health, (7) formulating feed and feeding, (8) breeding and record keeping, (9) handling and caring for animals,

(10) observing legal practices and following general safety precautions, (11) soil preparation, planting, irrigation, and harvesting.

The data were collected by means of personal interviews conducted by vocational agricultural instructors and county agents in each respective county. This combination of interviewers totalled 36 individuals who were involved in making contacts with Utah farmers. Of the 258 original questionnaires sent to interviewers, 165 usable returns were received yielding a 64% return.

Data were analyzed using the "Statistical Package for the Social Sciences" (SPSS) program which was developed at the University of California. A burrough's 6700 computer was utilized for program evaluation to find means, rankings, ranges, and frequencies. Other usable data made available through the computer program were individual county means and rankings as well as specific commodity group analysis. These added figures provide some interesting comparative information found in the appendices of this study.

Conclusions

Since one-third of all respondents in this study terminated their formal education with a high school diploma, a great challenge is posed for the vocational agricultural instructor. It becomes his responsibility to survey local employment needs, then implement his findings in the preparation of an on-target curriculum. This curriculum should not only be current with agricultural trends, but also be skill oriented to better prepare students for entry level employment.

The county extension personnel also have their portion of training

responsibility in the industry of production agriculture. Over 40% of farmers indicated training was desired in 47 of 114 competency areas. This type of information provides a sound basis for adult education short courses as taught by extension specialists. Such data can also give direction to existing young farmer training programs.

The findings in this study also support these additional conclusions:

1. It is difficult to differentiate between large and small farmers in general production agricultural operations.

2. Many areas of production agriculture have overlapping areas of skills and competencies.

3. There is a commonality of competencies needed by all who enter the production agriculture industry.

4. Animal health, maintaining equipment and vehicles, soil preparation, planting, irrigation and harvesting as well as observing legal practices and following general safety precautions were the four major competency areas considered most important by the farmers in production agriculture.

5. The number of full-time family employees shows an average of 9.1% fluctuation up or down over a five year period.

6. The number of part-time family employees will increase approximately 5% over a five year period.

7. The number of full-time non-family employees is projected to increase 10% over a five year period.

8. The number of non-family employees working part-time is projected to have a marked 18% decrease during the projected five-year period.

9. One-hundred ten of the one-hundred-fourteen competencies surveyed in this study were considered to be of some importance to the production agriculture industry.

Recommendations

As a result of this surveying effort and data analysis, this writer recommends:

1. That surveys of local needs be periodically used by vocational agricultural instructors in their respective areas to assess the validity of their curricula.

2. That all competencies receiving a 2.5 or higher rating be seriously considered as vital parts of vocational agricultural curriculums in the state of Utah.

3. That if time permits during the school year, the remaining competencies of this study be evaluated as to their local use.

4. That the adult training needs identified in this study be met by either extension specialists or vocational agricultural instructors or as a team involving both.

5. That adult training needs be prioritized to insure farmers that their major concerns are addressed first.

6. That individuals interested in further comparative data on commodity group analysis refer to the appendices of this study.

REFERENCES

Clary, Joseph R. & Ralph J. Woodin. Guidelines for the development of training programs for agricultural technicians. Department of Agriculture Education, The Ohio State University, June 1965.

Groves, Ramsey M. Colorado vocational agriculture teachers competency needs in agriculture mechanics with implications for curriculum and facilities. Project no. 31-1974. Colorado State University, Fort Collins, Colorado. November 1976.

Lewis, Wiley B. & Ralph J. Woodin. Agriculture mechanics as performed on Ohio farms in comparison with offerings in vocational agriculture. Department of Agriculture Education, The Ohio State University, August, 1970.

Long, Gilbert A. Cluster of tasks performed by Washington state farm operators engaged in seven types of agriculture production. U.S. Department of Health, Education and Welfare, Office of Education, Bureau of Resources, June 1968.

McClay, David R. Identifying and validating essential competencies needed for entry and advancement in major agriculture and agribusiness occupations. U.S. Department of Health, Education, and Welfare. Office of Education. Occupation and Adult Education Branch. May 1976 - May 1978.

Newcomb, L. H. The design of teacher education field experience to meet the needs of a new clientele. The Agriculture Education Magazine, October, 1976.

Zurbrick, Phillip R. Summaries of studies in agriculture education Pacific Region, 1973-74. Department of Agriculture Education University of Arizona, December 1974.

APPENDICES

APPENDIX A

SURVEY INSTRUMENTS

Sample Selection Information

Name of Extension Agent _____

County _____

In the blanks below, please list the names and addresses if possible of farmers in your county who fall "primarily" in one of the following areas of Production Agriculture. (If an area is not represented, write none). Small and large are judgement decisions. Use your judgement as to whether you consider the operators listed as large or small operators in your county.

		Names	Mailing Addresses
1.)	Beef		
	A. Small Operator		
	B. Large Operator		
2.)	Dairy		
	A. Small Operator		
	B. Large Operator		
3.)	Swine		
	A. Small Operator		
	B. Large Operator		
4.)	Sheep		
	A. Small Operator		
	B. Large Operator		
5.)	Poultry		
	A. Small Operator		
	B. Large Operator		
6.)	Crops		
	A. Small Operator		
	B. Large Operator		

Sample Selection Information

Name of Instructor _____

County _____

In the blanks below, please list the names and addresses if possible of the farmers in your county who fall "primarily" in one of the following areas of Production Agriculture. (If an area is not represented, write none). Use your judgement as to whether you consider the operators listed as large or small operators in your county.

1.) Beef — Names — Addresses

A. Small Operator _____

B. Large Operator _____

2.) Dairy

A. Small Operator _____

B. Large Operator _____

3.) Swine

A. Small Operator _____

B. Large Operator _____

4.) Sheep

A. Small Operator _____

B. Large Operator _____

5.) Poultry

A. Small Operator _____

B. Large Operator _____

6.) Crops

A. Small Operator _____

B. Large Operator _____

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322
COLLEGE OF AGRICULTURE

DEPARTMENT OF
AGRICULTURAL EDUCATION

Dear Fellow Vo-Ag. Instructors:

I'm writing this letter as a follow-up to some preliminary work we asked you to help us with during this year's summer conference. As you remember, we requested you to list the names of two farm operators, one large and one small in each of six defined areas of production agriculture. We would now hope to solicit your help in personally contacting some of the farmers you selected. With this year's fairs behind us and the harvest season near completion, hopefully the farmer will be more willing to take fifteen to twenty minutes of his time for a short interview. His cooperation may be further enchanced if you stress the fact that he is one of two farmers selected to represent his county in this state study and that his input is vital. This interview should provide us with current insight into agricultural trends and individual local needs. This information will be compiled after the interviews, and the results should be very valuable in future course development and especially useful for updating present curriculum if local needs indicate.

Enclosed you will find a number of survey sheets with the names of those farmers we would like you to survey. We have also included some extra survey sheets; these forms you can give to the farmer and let him read through the questions as you fill out the questionnaires. We have found that his method of interviewing usually produces the best results and takes less time. We would ask you to try and avoid biasing the individuals responses in any way, but merely ask him the questions and record his comments.

We sincerely appreciate your help in this study and we feel that it will benefit your program. This study has a second purpose; to help local farmers by identifying areas of agriculture that they would like to have more training in themselves. If at all possible we would like to receive the completed questionnaires by December 15th. If you have any questions or comments, please feel free to contact the Agricultural Education office at Utah State University, 752-4100, ext. 7311. Thank you for your help.

Sincerely,

Jim Summers

Jim Summers, Ag. Instructor W.S.H.S. Dayton,
Ag. Ed. Graduate Student, U.S.U.

Gilbert A. Long

Dr. Gilbert A. Long, Head
Department of Agricultural Education

JS/sa

Enclosures

INTERVIEW INSTRUCTIONS AND INFORMATION

A. Instructions

1. Try to be objective during interviews, avoid biasing the farmers responses.

2. Give the farmer a copy of the interview sheet, but unless he objects, you should fill out the copy to be returned.

3. If a portion of the survey doesn't pertain to a particular farmer, please indicate this by writing N/A or lining out so we know all questions were answered.

4. Often times a phone call to make an appointment with a farmer is effective in securing his cooperation and saving you time.

5. Inform the individual that his responses will be used for current trends versus curriculum in high school offered, plus it will aid the local extension agent in planning seminars and adult education programs.

6. If at all possible, return all survey sheets in the enclosed envelope by December 15th.

7. If any other questions arise contact the Agricultural Education Office, U.S.U. 752-4100 or 7311.

B. Additional Information

1. Questions were taken from the National Agriculture Competency Study.

2. Information gained will be used to update Vo-Ag. curriculums in the State of Utah and will also aid county agents in adult education programs.

3. This is a manpower training study being done through the Agricultural Education office at U.S.U., the Utah State Extension Service, and State Department of Vocational Education with funding support made available through the Agriculture Experiment Stations.

GENERAL INFORMATION

Please provide the following information:

Acres Owned: _____ Acres rented: _____ Total acres: _____

Irrigated land: _____acres Dry land: _____acres

CROPS:

Small grains	_____ acres	BLM	_____AUM's
Silage	_____ acres	Forest	_____AUM's
Hay	_____ acres	Private	_____AUM's
		Pasture	_____acres
		Row crops	_____acres

List crop types: _____

	Number of Head	
	Now	Last 5 year average
BEEF:		
Predominent Breed: _____		
Cows and bulls	____	____
Fat cattle	____	____
Feeder cattle	____	____
Replacement heifers	____	____
Breeding stock for sale:		
heifers	____	____
bulls	____	____
DAIRY:		
Predominent Breed: _____		
Bulls	____	____
Cows	____	____
Replacement heifers	____	____
Market cattle: (steers and bulls)	____	____
SWINE:		
Predominent Breed: _____		
Sows	____	____
Boars	____	____
Market hogs	____	____

	Number of Head	
	Now	Last 5 year average
SHEEP:		
Predominent Breed: _____		
Ewes	____	____
Rams	____	____
Market lambs	____	____
HORSES:		
Breed: _____		
Mares	____	____
Studs or geldings	____	____
POULTRY:		
Predominent Breed: _____		
Laying hens	____	____
Broilers	____	____
Chicks	____	____

How many employees do you hire:

	FAMILY		OTHERS	
	Full-Time	Part-Time	Full-Time	Part-Time
Two years ago	_____	_____	_____	_____
At the present time	_____	_____	_____	_____
Two years in the future	_____	_____	_____	_____

Please circle the appropriate responses to the following questions:
What percent of your income is earned through farming? 0-10; 11-20; 21-30; 31-40; 41-50; 51-60; 61-70; 71-80; 80-100.

Your age: _____ Additional occupation to farming _____

Highest grade of school completed: 8 or less; 9; 10; 11; 12; 13; 14; B.S.; M.S..

Preparation: On-the-job training: high school; college or university; veteran's program; adult education; other: _____.

How important are the following to your operation?:

On the following two pages please respond by circling the number according to the scale, indicated in the upper right hand corner, that is appropriate for each item, and circle yes if you need more training in that area:

EXAMPLE:
"Cultivating sugar beets . . . . . .0 1 2 3 4 yes no"

We can see that the cultivation of sugar beets is very important in this example and that the farmer needs more training in the cultivation area.

SCALE:
0 -does not apply
1 -not important
2 -of some importance
3 -important
4 -very important

Do you need more training in this area?

.00	PERSONAL EMPLOYEE ATTITUDES AND COMPETENCIES		
.01	Demonstrate a willingness to work 0 1 2 3 4	yes	no
.02	Demonstrate an ability to work on his own 0 1 2 3 4	yes	no
.03	Demonstrate the ability to get along with others. 0 1 2 3 4	yes	no
.04	Demonstrate the ability to project a desirable image for the farm or farmer he represents 0 1 2 3 4	yes	no
.05	Show a positive attitude toward necessary but undesirable tasks related to farming 0 1 2 3 4	yes	no
.00	MAINTAINING EQUIPMENT AND VEHICLES:		
.01	Maintain cooling systems (coolant, leaks, thermostats, hoses,)0 1 2 3 4	yes	no
.02	Install and service battery 0 1 2 3 4	yes	no
.03	Repack and replace bearings and seals 0 1 2 3 4	yes	no
.04	Maintain lubrication systems (oil, filters, grease) 0 1 2 3 4	yes	no
.05	Replace universal joints 0 1 2 3 4	yes	no
.06	Service air cleaners 0 1 2 3 4	yes	no
.07	Prepare equipment for storage 0 1 2 3 4	yes	no
.08	Maintain fuel system (filters, carburetors, sediment bowls) . 0 1 2 3 4	yes	no
.09	Maintain ignition systems (plugs, wires, timing, points, etc.)0 1 2 3 4	yes	no
.10	Maintain electric motors (clean and oil, install, replace belts and pulleys). 0 1 2 3 4	yes	no
.11	Install and adjust belts and chains on equipment 0 1 2 3 4	yes	no
.12	Inspect equipment for operating defects 0 1 2 3 4	yes	no
.00	CONSTRUCTING AND MAINTAINING BUILDINGS AND STRUCTURES		
.01	Adjust, recondition, sharpen, and store tools 0 1 2 3 4	yes	no
.02	Apply wood and metal preservatives 0 1 2 3 4	yes	no
.03	Construct and repair fences, gates, doors, and pens 0 1 2 3 4	yes	no
.04	Lay brick and block 0 1 2 3 4	yes	no
.05	Mix, cast, finish, and cure concrete, build and remove forms 0 1 2 3 4	yes	no
.06	Replace valves in water system and replace water pipe 0 1 2 3 4	yes	no
.07	Repair metal structures with arc welder or oxy-acetylene equipment 0 1 2 3 4	yes	no
.08	Building construction (framing, siding, roofing, etc.) . . . 0 1 2 3 4	yes	no
.09	Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures 0 1 2 3 4	yes	no

.00 BREEDING AND RECORD KEEPING:

.01	Mark animals for identification (ear tags, numbers, tattooes, brands etc.)	0 1 2 3 4	yes	no
.02	Record weaning weight	0 1 2 3 4	yes	no
.03	Record day of birth.	0 1 2 3 4	yes	no
.04	Determine number of males needed for brood herd.	0 1 2 3 4	yes	no
.05	Identify various causes of breeding difficulty.	0 1 2 3 4	yes	no
.06	Select a breeding method (pasture, AI, etc.)	0 1 2 3 4	yes	no
.07	Use artificial insemination	0 1 2 3 4	yes	no
.08	Register animals	0 1 2 3 4	yes	no

.00 HANDLING AND CARING FOR ANIMALS

.01	Fit and show animals	0 1 2 3 4	yes	no
.02	Control waste runoff from feedlots	0 1 2 3 4	yes	no
.03	Remove dead animals	0 1 2 3 4	yes	no
.04	Remove manure from quarters and spread it on fields.	0 1 2 3 4	yes	no
.05	Assist animals in delivering young	0 1 2 3 4	yes	no
.06	Castrate and dock animals.	0 1 2 3 4	yes	no
07	Dehorn animals	0 1 2 3 4	yes	no
08	Determine space needed for animals	0 1 2 3 4	yes	no
.09	Evaluate influence of stress on growth and condition of animals.	0 1 2 3 4	yes	no
.10	Isolate newly purchased animals for observation	0 1 2 3 4	yes	no
.11	Move feeder animals into proper feedlots	0 1 2 3 4	yes	no
.12	Trim hoofs	0 1 2 3 4	yes	no
.13	Bed animals	0 1 2 3 4	yes	no

.00 OBSERVING LEGAL PRACTICES AND FOLLOWING GENERAL SAFETY PRECAUTIONS

.01	Follow laws relating to chemical useage.	0 1 2 3 4	yes	no
.02	Interpret feed additive, mixing and withdrawal laws and regulations.	0 1 2 3 4	yes	no
.03	Know and follow shipping regulations for cattle (brand inspection, health certification)	0 1 2 3 4	yes	no
.04	Know and follow EPA regulations which apply to general farming operations	0 1 2 3 4	yes	no
.05	Identify and correct potential safety hazards.	0 1 2 3 4	yes	no
.06	Conveniently locate fire extinguishers in buildings and on equipment.	0 1 2 3 4	yes	no
.07	Wear appropriate and protective work clothing (safety glasses, respirators, etc.)	0 1 2 3 4	yes	no
.08	Read and understand information on labels and signs.	0 1 2 3 4	yes	no
.09	Properly store and dispose of chemical and inflammable materials.	0 1 2 3 4	yes	no

.00 SOIL PREPARATION, PLANTING, IRRIGATING AND HARVESTING

.01	Figuring which fertilizer, how much, and when to apply	0 1 2 3 4	yes	no
.02	Preparing seed bed for planting.	0 1 2 3 4	yes	no
.03	Utilizing soil test information	0 1 2 3 4	yes	no
.04	Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	0 1 2 3 4	yes	no
.05	Understanding the value of crop rotation	0 1 2 3 4	yes	no
.06	Knowing the strong and weak points of various crop varieties	0 1 2 3 4	yes	no
.07	Knowing the various methods of weed control (chemical, mechanical, and biological	0 1 2 3 4	yes	no
.08	Understanding proper fertilizer useage and recognizing trace element deficiences or toxicities	0 1 2 3 4	yes	no
.09	Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines."	0 1 2 3 4	yes	no
.10	Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood, etc.).	0 1 2 3 4	yes	no
.11	Determining soil moisture content and its relation to various soil types. (Sand, silt, or clay)	0 1 2 3 4	yes	no
.12	Identify and correct specific field drainage problems.	0 1 2 3 4	yes	no

.00 MARKETING AND SHIPPING:

.01	Select market	0 1 2 3 4	yes no
.02	Interpret market reports	0 1 2 3 4	yes no
.03	Analyze market cycles	0 1 2 3 4	yes no
.04	Select appropriate marketing system (futures, contracts, etc.)	0 1 2 3 4	yes no
.05	Identify characteristics of USDA grades	0 1 2 3 4	yes no
.06	Calculate shrinkage	0 1 2 3 4	yes no
.07	Sort animals according to size and weight	0 1 2 3 4	yes no
.08	Determine when animals are ready to market	0 1 2 3 4	yes no

.00 SELECTING BREEDING AND FEEDING STOCK:

.01	Establish production goals for culling purposes	0 1 2 3 4	yes no
.02	Identify and evaluate advantages of various breeds	0 1 2 3 4	yes no
.03	Evaluate general conditions of animals.	0 1 2 3 4	yes no
.04	Evaluate influence of consumer demand on type of animal to select.	0 1 2 3 4	yes no
.05	Keep and evaluate various traits and characteristics, and defects	0 1 2 3 4	yes no
.06	Evaluate the degree various traits and characteristics are inherited	0 1 2 3 4	yes no
.07	Inspect animals for desirable traits, characteristics, and defects	0 1 2 3 4	yes no
.08	Select breeding system to follow (cross-breeding, line-breeding, etc.)	0 1 2 3 4	yes no
.09	Select foundation or replacement stock	0 1 2 3 4	yes no
.10	Keep individual production records.	0 1 2 3 4	yes no

.00 MAINTAINING HERD HEALTH:

.01	Identify and control internal and external parasites	0 1 2 3 4	yes no
.02	Work with veterinarians in developing herd health program	0 1 2 3 4	yes no
.03	Identify sanitation problems which may affect the herd health	0 1 2 3 4	yes no
.04	Use insecticide repellants in buildings.	0 1 2 3 4	yes no
.05	Identify symptoms of common diseases	0 1 2 3 4	yes no
.06	Identify symptoms of nutritional imbalance	0 1 2 3 4	yes no
.07	Calculate cost of treatments	0 1 2 3 4	yes no
.08	Supply medication through feed and water	0 1 2 3 4	yes no
.09	Isolate animals with transmissible disease and/or injuries	0 1 2 3 4	yes no
.10	Select appropriate method to control diseases	0 1 2 3 4	yes no
.11	Vaccinate animals (intra-muscular, intravenous, subcutaneous	0 1 2 3 4	yes no
.12	Interpret labels on medications and insecticide containers	0 1 2 3 4	yes no
.13	Apply medication to cuts and bruises	0 1 2 3 4	yes no

.00 FORMULATING FEED AND FEEDING:

.01	Calculate cost of rations and feed mixtures	0 1 2 3 4	yes no
.02	Calculate feed efficiency.	0 1 2 3 4	yes no
.03	Determine appropriate form and prepare feed mixtures	0 1 2 3 4	yes no
.04	Substitute for various feedstuffs in rations	0 1 2 3 4	yes no
.05	Determine and balance rations for livestock.	0 1 2 3 4	yes no
.06	Work with veterinarian and feed salesman in formulating feed mixture and planning feeding programs	0 1 2 3 4	yes no
.07	Precondition animals for feedlot or shipping	0 1 2 3 4	yes no
.08	Determine water requirements for animals	0 1 2 3 4	yes no
.09	Determine when feed additives should be withdrawn from animals (antibiotics, stilbestrol, etc.)	0 1 2 3 4	yes no
.10	Evaluate the influence the quality of feedstuffs has on production	0 1 2 3 4	yes no
.11	Evaluate how ration imbalance may affect production	0 1 2 3 4	yes no
.12	Identify factors that influence the quality of feedstuffs (wet hay, etc.).	0 1 2 3 4	yes no
.13	Interpret feed analysis reports (to have your feed analyzed)	0 1 2 3 4	yes no
.14	Interpret feed tags and labels	0 1 2 3 4	yes no
.15	Determine how feed palatability may be improved	0 1 2 3 4	yes no

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322
COLLEGE OF AGRICULTURE

DEPARTMENT OF
AGRICULTURAL EDUCATION

January 18, 1979

Dear Vo. Ag. Teacher:

As January is rapidly passing, I would just like to remind you of the interview questionnaires that you were sent some time ago. At present, we have received quite a number of completed questionnaires with some very usable information. Most of the information that has been sent in so far has been from County Agents in the State. We realize that an Extension Agent's schedule is much more flexible than that of an Agricultural Teacher and that it takes much effort on your part to help us with these local interviews. We really appreciate your help in contacting the farmers in your area and we feel that if we receive the remaining surveys from your county and a few others in the state, we can put together some usable information for your future use.

Please help us complete the personal interviews in the next few weeks if possible inasmuch as we hope to compile the information during mid February. Your information will be a vital part in the overall State Manpower Study. Again, thank you for your help. If you have any questions, contact the Agricultural Education Office at Utah State University(752-4100 ext 7311).

Thank you for your cooperation on this matter.

Respectfully yours,

James O. Summers
James O. Summers
Vo. Ag. Instructor, Westside High School
Dayton Idaho
Ag. Ed. Graduate Student, USU

Dr. Gilbert A. Long, Head
Department of Agricultural Education

JS:nn

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322
COLLEGE OF AGRICULTURE

DEPARTMENT OF
AGRICULTURAL EDUCATION

June 4, 1979

Please accept this honorarium check in appreciation for your vital part played in our recent surveying effort of key farmers in Utah. Funds of $6.00 per usable survey were made available through the Agricultural Research Station funds and we are happy to be able to send you this small amount for your patience and time spent. At present, the surveys are being key punched for computer analysis and the information seems to be very useful in identifying various areas which may need further emphasis in both high school curriculum and adult programs.

Thanks again for your help.

Sincerely,

Gilbert A. Long

Dr. Gilbert A. Long,
Head Agricultural Education

James O. Summers

James O. Summers
Ag. Instructor Westside High School
Graduate Assistant USU
Agricultural Education

GL:nn

APPENDIX B

BEEF

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Demonstrate a willingness to work	2.84	3.83	26.1	30.6
Demonstrate an ability to work on his own	2.80	3.97	25.5	17.8
Demonstrate the ability to get along with others	2.56	3.28	23.0	25.0
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.64	27.3	19.4
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.30	22.4	25.0

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Maintain lubrication systems (oil, filters, grease)	3.29	3.63	32.7	36.1
Inspect equipment for operating defects	3.23	3.46	40.0	22.3
Service air cleaners	3.20	3.51	28.5	36.2
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.43	35.8	25.0
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.44	42.4	33.3
Install and adjust belts and chains on equipment	3.06	3.14	30.3	41.7
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.44	51.5	33.3
Repack and replace bearings and seals	2.98	3.26	35.8	25.0
Prepare equipment for storage	2.94	3.11	37.6	25.0
Install and service battery	2.89	3.30	26.7	47.0
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.00	44.2	55.6
Replace universal joints	2.76	2.91	37.6	30.6

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Construct and repair fences, gates, doors and pens	3.03	3.44	29.1	36.1
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	2.97	59.4	47.2
Replace valves in water system and replace water pipe	2.80	2.94	35.8	36.1
Adjust, recondition, sharpen, and store tools	2.78	2.91	36.4	28.7
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	3.24	48.5	38.9
Building construction (framing, siding, roofing, etc.)	2.53	2.71	48.5	58.3
Apply wood and metal preservatives	2.53	2.72	33.9	38.9
Mix, cast, finish, and cure concrete, build and remove forms	2.29	2.74	41.8	38.9
Lay brick and block	1.76	2.36	38.8	44.4

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Select market	3.14	3.57	54.5	52.3
Interpret market reports	3.01	3.53	54.5	63.9
Analyze market cycles	2.95	3.56	61.8	52.8
Determine when animals are ready to market	2.85	3.41	35.2	36.1
Sort animals according to size and weight	2.76	3.26	32.7	33.3
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.26	57.6	63.9
Identify characteristics of USDA grades	2.70	3.06	54.5	58.3
Calculate shrinkage	2.67	3.17	40.0	61.1

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Evaluate general conditions of animals	3.16	3.71	36.4	52.3
Select foundation or replacement stock	3.15	3.74	49.1	58.3
Establish production goals for culling purposes	3.12	3.57	48.5	38.9
Keep individual production records	3.09	3.54	46.7	50.0
Inspect animals for desirable traits, characteristics, and defects	3.01	3.56	49.7	58.3
Evaluate the degree various traits and characteristics are inherited	2.92	3.46	53.9	55.6
Keep and evaluate various traits and characteristics and defects	2.86	3.29	45.5	41.7
Identify and evaluate advantages of various breeds	2.86	3.31	43.6	52.3
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	3.67	50.3	47.2
Evaluate influence of consumer demand on type of animal to select	2.65	3.26	39.4	41.7

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Identify symptoms of common diseases	3.39	3.69	66.1	55.6
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.81	43.6	63.9
Select appropriate method to control diseases	3.28	3.74	61.2	36.1
Identify and control internal and external parasites	3.25	3.58	60.0	47.2
Identify symptoms of nutritional imbalance	3.24	3.56	66.1	72.2
Interpret labels on medications and insecticide containers	3.18	3.57	47.9	41.7
Identify sanitation problems which may affect the herd health	3.12	3.34	50.9	50.0
Isolate animals with transmissible diseases and/or injuries	3.11	3.61	39.4	41.7
Work with veterinarians in developing herd health program	2.94	3.37	52.7	58.3
Calculate cost of treatments	2.89	3.37	48.5	77.8
Apply medication to cuts and bruises	2.89	3.42	38.8	50.0
Supply medication through feed and water	2.75	3.00	46.7	55.6
Use insecticide repellants in buildings	2.69	3.03	50.3	55.6

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Determine and balance rations for livestock	3.11	3.56	47.6	55.6
Calculate cost of rations and feed mixtures	3.09	3.56	55.2	41.7
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.44	49.7	52.8
Calculate feed efficiency	2.99	3.38	57.6	63.9
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.35	51.5	41.7
Determine appropriate form and prepare feed mixtures	2.92	3.40	52.1	58.3
Evaluate how ration imbalance may affect production	2.91	3.42	55.2	50.0
Determine how feed palatability may be improved	2.87	3.36	57.5	44.4
Substitute for various feedstuffs in rations	2.82	3.42	51.5	61.1
Interpret feed tags and labels	2.80	3.24	43.0	47.2
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.16	52.1	44.4
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	3.09	34.5	25.0
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	3.03	38.8	58.3
Determine water requirements for animals	2.48	2.94	30.9	44.4
Precondition animals for feedlot or shipping	2.38	3.21	35.2	41.7

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	3.43	25.5	58.3
Identify various causes of breeding difficulty	2.87	3.69	52.7	16.7
Select a breeding method (pasture, AI, etc.)	2.63	3.32	27.9	47.2
Record day of birth	2.45	2.94	20.6	22.2
Determine number of males needed for brood herd	2.36	3.33	17.6	16.7
Record weaning weight	2.19	3.09	19.4	25.0
Use artificial insemination	2.07	2.61	26.7	27.0
Register animals	1.86	3.00	21.2	16.7

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Assist animals in delivering young	3.09	3.66	41.8	16.7
Castrate and dock animals	2.98	3.47	29.1	52.8
Remove manure from quarters and spread it on fields	2.77	3.17	18.2	19.4
Evaluate influence of stress on growth and condition of animals	2.75	3.21	43.6	22.2
Dehorn animals	2.61	3.50	27.3	30.6
Remove dead animals	2.61	3.11	16.4	16.7
Determine space needed for animals	2.51	3.13	23.6	25.0
Isolate newly purchased animals for observation	2.44	3.00	23.0	36.1
Bed animals	2.40	2.97	18.2	30.6
Trim hoofs	2.19	2.91	32.1	30.6
Control waste runoff from feedlots	2.14	2.59	21.8	25.0
Move feeder animals into proper feedlots	1.98	2.96	17.6	19.4
Fit and show animals	1.55	2.64	20.6	16.7

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Identify and correct potential safety hazards	3.33	3.37	49.7	47.2
Properly store and dispose of chemical and inflammable materials	3.24	3.44	42.4	50.0
Read and understand information on labels and signs	3.23	3.39	42.4	58.3
Follow laws relating to chemical usage	3.22	3.41	54.5	11.1
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.27	40.6	47.2
Conveniently locate fire extinguishers in buildings and on equipment	2.99	3.21	41.2	47.2
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.27	42.4	66.6
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	3.48	33.9	44.4
Know and follow EPA regulations which apply to general farming operations	2.56	2.88	49.1	41.7

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Beef	State	Beef
Figuring which fertilizer, how much, and when to apply	3.26	3.83	63.6	61.1
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.56	72.7	80.6
Preparing seed bed for planting	3.16	3.62	43.0	36.1
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.68	54.5	55.6
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.49	70.9	72.2
Knowing the strong and weak points of various crop varieties	3.10	3.49	68.5	80.6
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.51	60.0	63.9
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.54	55.8	55.6
Understanding the value of crop rotation	3.03	3.56	46.1	41.7
Utilizing soil test information	2.92	3.35	61.2	61.1
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.27	57.6	63.9
Identify and correct specific field drainage problems	2.65	3.23	41.8	28.6

APPENDIX C

DAIRY

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Demonstrate a willingness to work	2.84	3.65	26.1	33.3
Demonstrate an ability to work on his own	2.80	3.62	25.5	27.8
Demonstrate the ability to get along with others	2.56	3.60	23.0	26.1
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.56	27.3	26.7
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.24	22.4	26.7

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Maintain lubrication systems (oil, filters, grease)	3.29	3.57	32.7	33.3
Inspect equipment for operating defects	3.23	3.43	40.0	30.0
Service air cleaners	3.20	3.21	28.5	40.0
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.57	35.8	36.7
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.25	42.4	36.7
Install and adjust belts and chains on equipment	3.06	3.28	30.3	56.7
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.45	51.5	36.7
Repack and replace bearings and seals	2.98	3.21	35.8	23.3
Prepare equipment for storage	2.94	3.18	37.6	23.4
Install and service battery	2.89	3.32	26.7	33.3
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.10	44.2	53.4
Replace universal joints	2.76	3.07	37.6	33.3

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Construct and repair fences, gates, doors and pens	3.03	3.28	29.1	23.3
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	3.00	59.4	50.0
Replace valves in water system and replace water pipe	2.80	3.07	35.8	46.7
Adjust, recondition, sharpen, and store tools	2.78	3.21	36.4	36.7
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	3.41	48.5	26.7
Building construction (framing, siding, roofing, etc.)	2.53	3.03	48.5	50.0
Apply wood and metal preservatives	2.53	2,72	33.9	30.0
Mix, cast, finish, and cure concrete, build and remove forms	2.29	2.83	41.8	56.7
Lay brick and block	1.76	2.48	38.8	20.0

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Select market	3.14	3.31	54.5	70.0
Interpret market reports	3.01	3.23	54.5	53.3
Analyze market cycles	2.95	3.12	61.8	50.0
Determine when animals are ready to market	2.85	3.00	35.2	30.0
Sort animals according to size and weight	2.76	2.83	32.7	30.0
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.96	57.6	50.0
Identify characteristics of USDA grades	2.70	2.80	54.5	50.0
Calculate shrinkage	2.67	3.78	40.0	40.0

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Evaluate general conditions of animals	3.16	3.30	36.4	33.3
Select foundation or replacement stock	3.15	3.60	49.1	50.0
Establish production goals for culling purposes	3.12	3.77	48.5	26.7
Keep individual production records	3.09	3.72	46.7	56.7
Inspect animals for desirable traits, characteristics, and defects	3.01	3.43	49.7	70.0
Evaluate the degree various traits and characteristics are inherited	2.92	3.33	53.9	60.0
Keep and evaluate various traits and characteristics and defects	2.86	3.43	45.5	33.3
Identify and evaluate advantages of various breeds	2.86	2.96	43.6	63.3
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	2.78	50.3	56.7
Evaluate influence of consumer demand on type of animal to select	2.65	2.89	39.4	33.3

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Identify symptoms of common diseases	3.39	3.50	66.1	56.7
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.69	43.6	66.6
Select appropriate method to control diseases	3.28	3.57	61.2	40.0
Identify and control internal and external parasites	3.25	3.24	60.0	46.7
Identify symptoms of nutritional imbalance	3.24	3.50	66.1	66.6
Interpret labels on medications and insecticide containers	3.18	3.66	47.9	40.0
Identify sanitation problems which may affect the herd health	3.12	3.47	50.9	63.3
Isolate animals with transmissible diseases and/or injuries	3.11	3.30	39.4	46.7
Work with veterinarians in developing herd health program	2.94	3.52	52.7	56.7
Calculate cost of treatments	2.89	3.07	48.5	73.3
Apply medication to cuts and bruises	2.89	2.93	38.8	50.0
Supply medication through feed and water	2.75	2.89	46.7	46.7
Use insecticide repellants in buildings	2.69	3.17	50.3	56.7

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Determine and balance rations for livestock	3.11	3.63	47.6	60.0
Calculate cost of rations and feed mixtures	3.09	3.69	55.2	40.0
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.60	49.7	60.0
Calculate feed efficiency	2.99	3.55	57.6	66.6
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.53	51.5	26.7
Determine appropriate form and prepare feed mixtures	2.92	3.28	52.1	70.0
Evaluate how ration imbalance may affect production	2.91	3.62	55.2	56.7
Determine how feed palatability may be improved	2.87	3.45	57.5	53.3
Substitute for various feedstuffs in rations	2.82	3.07	51.5	60.0
Interpret feed tags and labels	2.80	3.41	43.0	73.3
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.37	52.1	56.7
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	2.83	34.5	26.7
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	3.24	38.8	73.3
Determine water requirements for animals	2.48	2.71	30.9	26.7
Precondition animals for feedlot or shipping	2.38	2.74	35.2	50.0

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	3.66	25.5	66.6
Identify various causes of breeding difficulty	2.87	3.70	52.7	23.3
Select a breeding method (pasture, AI, etc.)	2.63	3.60	27.9	80.0
Record day of birth	2.45	3.52	20.6	16.7
Determine number of males needed for brood herd	2.36	3.16	17.6	26.7
Record weaning weight	2.19	2.38	19.4	33.3
Use artificial insemination	2.07	3.63	26.7	40.0
Register animals	1.86	2.85	21.2	40.0

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Assist animals in delivering young	3.09	3.80	41.8	30.0
Castrate and dock animals	2.98	3.32	29.1	43.3
Remove manure from quarters and spread it on fields	2.77	3.45	18.2	26.7
Evaluate influence of stress on growth and condition of animals	2.75	3.27	43.6	43.3
Dehorn animals	2.61	3.53	27.3	30.0
Remove dead animals	2.61	3.11	16.4	36.7
Determine space needed for animals	2.51	3.41	23.6	40.0
Isolate newly purchased animals for observation	2.44	3.11	23.0	53.3
Bed animals	2.40	3.62	18.2	56.7
Trim hoofs	2.19	3.41	32.1	20.0
Control waste runoff from feedlots	2.14	3.03	21.8	30.0
Move feeder animals into proper feedlots	1.98	3.05	17.6	33.3
Fit and show animals	1.55	2.81	20.6	26.7

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Identify and correct potential safety hazards	3.33	3.33	49.7	46.7
Properly store and dispose of chemical and inflammable materials	3.24	3.67	42.4	43.3
Read and understand information on labels and signs	3.23	3.30	42.4	46.7
Follow laws relating to chemical usage	3.22	3.54	54.5	36.7
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.00	40.6	50.0
Conveniently locate fire extinguishers in buildings and on equipment	2.99	3.07	41.2	46.7
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.21	42.4	56.7
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	3.04	33.9	50.0
Know and follow EPA regulations which apply to general farming operations	2.56	2.79	49.1	33.3

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Dairy	State	Dairy
Figuring which fertilizer, how much, and when to apply	3.26	3.75	63.6	73.3
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.64	72.7	80.0
Preparing seed bed for planting	3.16	3.75	43.0	53.3
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.57	54.5	60.0
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.61	70.9	76.7
Knowing the strong and weak points of various crop varieties	3.10	3.57	68.5	70.0
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.61	60.0	66.6
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.46	55.8	63.3
Understanding the value of crop rotation	3.03	3.63	46.1	53.3
Utilizing soil test information	2.92	3.43	61.2	80.0
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.25	57.6	60.0
Identify and correct specific field drainage problems	2.65	3.33	41.8	60.0

APPENDIX D

SWINE

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Demonstrate a willingness to work	2.84	3.92	26.1	12.5
Demonstrate an ability to work on his own	2.80	3.62	25.5	8.3
Demonstrate the ability to get along with others	2.56	3.69	23.0	12.5
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.54	27.3	12.5
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.54	22.4	12.5

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Maintain lubrication systems (oil, filters, grease)	3.29	3.58	32.7	29.2
Inspect equipment for operating defects	3.23	3.35	40.0	37.5
Service air cleaners	3.20	3.78	28.5	25.0
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.10	35.8	12.5
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.26	42.4	37.5
Install and adjust belts and chains on equipment	3.06	3.30	30.3	41.7
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.11	51.5	37.5
Repack and replace bearings and seals	2.98	3.06	35.8	16.7
Prepare equipment for storage	2.94	3.11	37.6	33.3
Install and service battery	2.89	3.11	26.7	8.3
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.11	44.2	41.7
Replace universal joints	2.76	3.00	37.6	33.3

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Construct and repair fences, gates, doors and pens	3.03	3.38	29.1	29.2
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	3.32	59.4	37.5
Replace valves in water system and replace water pipe	2.80	3.33	35.8	37.5
Adjust, recondition, sharpen, and store tools	2.78	3.26	36.4	41.7
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	3.33	48.5	29.2
Building construction (framing, siding, roofing, etc.)	2.53	3.26	48.5	37.5
Apply wood and metal preservatives	2.53	3.11	33.9	33.3
Mix, cast, finish, and cure concrete, build and remove forms	2.29	3.11	41.8	41.7
Lay brick and block	1.76	2.87	38.8	29.2

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Select market	3.14	3.52	54.5	58.3
Interpret market reports	3.01	3.19	54.5	45.8
Analyze market cycles	2.95	3.15	61.8	50.0
Determine when animals are ready to market	2.85	3.45	35.2	33.3
Sort animals according to size and weight	2.76	3.18	32.7	50.0
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.10	57.6	62.5
Identify characteristics of USDA grades	2.70	3.00	54.5	62.5
Calculate shrinkage	2.67	3.10	40.0	62.5

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Evaluate general conditions of animals	3.16	3.45	36.4	58.3
Select foundation or replacement stock	3.15	3.76	49.1	50.0
Establish production goals for culling purposes	3.12	3.23	48.5	37.5
Keep individual production records	3.09	3.71	46.7	50.0
Inspect animals for desirable traits, characteristics, and defects	3.01	3.59	49.7	58.3
Evaluate the degree various traits and characteristics are inherited	2.92	3.41	53.9	41.7
Keep and evaluate various traits and characteristics and defects	2.86	2.34	45.5	45.8
Identify and evaluate advantages of various breeds	2.86	3.35	43.6	50.0
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	3.24	50.3	54.2
Evaluate influence of consumer demand on type of animal to select	2.65	3.19	39.4	37.5

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Identify symptoms of common diseases	3.39	3.75	66.1	58.3
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.65	43.6	62.5
Select appropriate method to control diseases	3.28	3.63	61.2	45.8
Identify and control internal and external parasites	3.25	3.63	60.0	62.5
Identify symptoms of nutritional imbalance	3.24	3.74	66.1	66.6
Interpret labels on medications and insecticide containers	3.18	3.32	47.9	33.3
Identify sanitation problems which may affect the herd health	3.12	3.61	50.9	66.6
Isolate animals with transmissible diseases and/or injuries	3.11	3.70	39.4	58.3
Work with veterinarians in developing herd health program	2.94	3.41	52.7	70.8
Calculate cost of treatments	2.89	3.39	48.5	75.0
Apply medication to cuts and bruises	2.89	3.32	38.8	33.3
Supply medication through feed and water	2.75	3.61	46.7	62.5
Use insecticide repellants in buildings	2.69	3.45	50.3	66.6

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Determine and balance rations for livestock	3.11	3.48	47.6	54.2
Calculate cost of rations and feed mixtures	3.09	3.70	55.2	45.8
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.39	49.7	58.3
Calculate feed efficiency	2.99	3.42	57.6	62.5
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.29	51.5	37.5
Determine appropriate form and prepare feed mixtures	2.92	3.39	52.1	79.2
Evaluate how ration imbalance may affect production	2.91	3.30	55.2	50.0
Determine how feed palatability may be improved	2.87	3.45	57.5	41.7
Substitute for various feedstuffs in rations	2.82	3.52	51.5	62.5
Interpret feed tags and labels	2.80	3.32	43.0	54.2
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.10	52.1	58.3
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	3.41	34.5	45.8
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	2.86	38.8	62.5
Determine water requirements for animals	2.48	3.27	30.9	41.7
Precondition animals for feedlot or shipping	2.38	2.95	35.2	37.5

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	3.43	25.5	58.3
Identify various causes of breeding difficulty	2.87	3.41	52.7	20.8
Select a breeding method (pasture, AI, etc.)	2.63	3.05	27.9	54.2
Record day of birth	2.45	3.14	20.6	29.2
Determine number of males needed for brood herd	2.36	3.15	17.6	25.0
Record weaning weight	2.19	3.00	19.4	37.5
Use artificial insemination	2.07	3.06	26.7	25.0
Register animals	1.86	2.88	21.2	45.8

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Assist animals in delivering young	3.09	3.35	41.8	16.7
Castrate and dock animals	2.98	3.41	29.1	37.5
Remove manure from quarters and spread it on fields	2.77	3.09	18.2	8.3
Evaluate influence of stress on growth and condition of animals	2.75	3.27	43.6	25.0
Dehorn animals	2.61	3.58	27.3	33.3
Remove dead animals	2.61	3.23	16.4	25.0
Determine space needed for animals	2.51	2.95	23.6	20.8
Isolate newly purchased animals for observation	2.44	3.19	23.0	45.8
Bed animals	2.40	3.00	18.2	25.0
Trim hoofs	2.19	2.44	32.1	25.0
Control waste runoff from feedlots	2.14	2.85	21.8	25.0
Move feeder animals into proper feedlots	1.98	3.17	17.6	29.2
Fit and show animals	1.55	2.65	20.6	29.2

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Identify and correct potential safety hazards	3.33	3.46	49.7	45.8
Properly store and dispose of chemical and inflammable materials	3.24	3.21	42.4	33.3
Read and understand information on labels and signs	3.23	3.32	42.4	25.0
Follow laws relating to chemical usage	3.22	3.27	54.5	25.0
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.43	40.6	46.7
Conveniently locate fire extinguishers in buildings and on equipment	2.99	2.95	41.2	41.7
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.35	42.4	41.7
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	3.53	33.9	41.7
Know and follow EPA regulations which apply to general farming operations	2.56	2.91	49.1	25.0

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Swine	State	Swine
Figuring which fertilizer, how much, and when to apply	3.26	3.72	63.6	62.5
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.61	72.7	58.3
Preparing seed bed for planting	3.16	3.72	43.0	45.8
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.56	54.5	45.8
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.42	70.9	58.3
Knowing the strong and weak points of various crop varieties	3.10	3.53	68.5	54.2
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.50	60.0	50.0
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.39	55.8	41.7
Understanding the value of crop rotation	3.03	3.56	46.1	41.7
Utilizing soil test information	2.92	3.76	61.2	62.5
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.11	57.6	50.0
Identify and correct specific field drainage problems	2.65	3.33	41.8	52.2

APPENDIX E

SHEEP

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Demonstrate a willingness to work	2.84	3.84	26.1	30.3
Demonstrate an ability to work on his own	2.80	3.63	25.5	27.3
Demonstrate the ability to get along with others	2.56	3.42	23.0	27.7
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.17	27.3	30.3
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.46	22.4	27.7

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Maintain lubrication systems (oil, filters, grease)	3.29	3.30	32.7	36.6
Inspect equipment for operating defects	3.23	3.41	40.0	27.7
Service air cleaners	3.20	3.48	28.5	45.5
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.43	35.8	30.0
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.67	42.4	39.4
Install and adjust belts and chains on equipment	3.06	3.40	30.3	36.6
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.33	51.5	39.1
Repack and replace bearings and seals	2.98	3.28	35.8	36.6
Prepare equipment for storage	2.94	3.43	37.6	33.3
Install and service battery	2.89	3.10	26.7	36.6
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.33	44.2	48.5
Replace universal joints	2.76	31.7	37.6	36.6

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Construct and repair fences, gates, doors and pens	3.03	3.23	29.1	30.3
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	2.75	59.4	51.5
Replace valves in water system and replace water pipe	2.80	2.90	35.8	39.4
Adjust, recondition, sharpen, and store tools	2.78	3.00	36.4	45.5
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	2.88	48.5	42.4
Building construction (framing, siding, roofing, etc.)	2.53	2.77	48.5	42.4
Apply wood and metal preservatives	2.53	2.75	33.9	33.3
Mix, cast, finish, and cure concrete, build and remove forms	2.29	2.63	41.8	30.3
Lay brick and block	1.76	2.35	38.8	21.2

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Select market	3.14	3.48	54.5	57.6
Interpret market reports	3.01	3.45	54.5	57.6
Analyze market cycles	2.95	3.42	61.8	57.6
Determine when animals are ready to market	2.85	3.48	35.2	36.6
Sort animals according to size and weight	2.76	3.24	32.7	51.5
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.21	57.6	72.7
Identify characteristics of USDA grades	2.70	3.03	54.5	63.6
Calculate shrinkage	2.67	3.03	40.0	60.6

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Evaluate general conditions of animals	3.16	3.53	36.4	51.5
Select foundation or replacement stock	3.15	3.56	49.1	51.5
Establish production goals for culling purposes	3.12	3.34	48.5	39.4
Keep individual production records	3.09	3.28	46.7	51.5
Inspect animals for desirable traits, characteristics, and defects	3.01	3.42	49.7	48.5
Evaluate the degree various traits and characteristics are inherited	2.92	3.31	53.9	36.6
Keep and evaluate various traits and characteristics and defects	2.86	3.16	45.5	36.6
Identify and evaluate advantages of various breeds	2.86	3.44	43.6	45.5
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	3.40	50.3	48.5
Evaluate influence of consumer demand on type of animal to select	2.65	3.16	39.4	36.6

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Identify symptoms of common diseases	3.39	3.44	66.1	48.5
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.35	43.6	54.5
Select appropriate method to control diseases	3.28	3.29	61.2	36.6
Identify and control internal and external parasites	3.25	3.39	60.0	42.4
Identify symptoms of nutritional imbalance	3.24	3.23	66.1	60.6
Interpret labels on medications and insecticide containers	3.18	3.16	47.9	51.5
Identify sanitation problems which may affect the herd health	3.12	3.29	50.9	48.5
Isolate animals with transmissible diseases and/or injuries	3.11	3.26	39.4	42.4
Work with veterinarians in developing herd health program	2.94	3.17	52.7	60.6
Calculate cost of treatments	2.89	3.03	48.5	54.5
Apply medication to cuts and bruises	2.89	3.34	38.8	51.5
Supply medication through feed and water	2.75	3.07	46.7	54.5
Use insecticide repellants in buildings	2.69	3.97	50.3	48.5

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Determine and balance rations for livestock	3.11	3.34	47.6	45.5
Calculate cost of rations and feed mixtures	3.09	3.17	55.2	42.4
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.27	49.7	51.5
Calculate feed efficiency	2.99	3.14	57.6	48.5
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.07	51.5	36.6
Determine appropriate form and prepare feed mixtures	2.92	3.18	52.1	48.5
Evaluate how ration imbalance may affect production	2.91	3.11	55.2	51.5
Determine how feed palatability may be improved	2.87	3.11	57.5	45.5
Substitute for various feedstuffs in rations	2.82	3.27	51.5	42.4
Interpret feed tags and labels	2.80	2.93	43.0	45.5
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.04	52.1	54.5
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	3.13	34.5	36.6
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	2.58	38.8	60.6
Determine water requirements for animals	2.48	3.14	30.9	33.3
Precondition animals for feedlot or shipping	2.38	3.14	35.2	36.6

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	3.20	25.5	57.6
Identify various causes of breeding difficulty	2.87	3.13	52.7	21.2
Select a breeding method (pasture, AI, etc.)	2.63	3.18	27.9	51.5
Record day of birth	2.45	2.58	20.6	24.2
Determine number of males needed for brood herd	2.36	3.24	17.6	18.2
Record weaning weight	2.19	2.79	19.4	27.3
Use artificial insemination	2.07	2.29	26.7	27.8
Register animals	1.86	2.45	21.2	21.2

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Assist animals in delivering young	3.09	3.58	41.8	12.1
Castrate and dock animals	2.98	3.65	29.1	48.5
Remove manure from quarters and spread it on fields	2.77	3.07	18.2	15.2
Evaluate influence of stress on growth and condition of animals	2.75	3.89	43.6	12.1
Dehorn animals	2.61	3.36	27.3	36.6
Remove dead animals	2.61	2.71	16.4	18.2
Determine space needed for animals	2.51	2.81	23.6	33.3
Isolate newly purchased animals for observation	2.44	2.84	23.0	45.5
Bed animals	2.40	3.00	18.2	27.8
Trim hoofs	2.19	3.00	32.1	18.0
Control waste runoff from feedlots	2.14	2.61	21.8	21.2
Move feeder animals into proper feedlots	1.98	2.88	17.6	18.2
Fit and show animals	1.55	2.75	20.6	24.2

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Identify and correct potential safety hazards	3.33	3.27	49.7	45.5
Properly store and dispose of chemical and inflammable materials	3.24	3.36	42.4	36.6
Read and understand information on labels and signs	3.23	3.21	42.4	30.3
Follow laws relating to chemical usage	3.22	3.00	54.5	9.1
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.17	40.6	39.4
Conveniently locate fire extinguishers in buildings and on equipment	2.99	3.11	41.2	51.5
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.00	42.4	48.8
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	2.96	33.9	33.3
Know and follow EPA regulations which apply to general farming operations	2.56	2.36	49.1	33.3

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Sheep	State	Sheep
Figuring which fertilizer, how much, and when to apply	3.26	3.57	63.6	60.6
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.35	72.7	72.7
Preparing seed bed for planting	3.16	3.50	43.0	42.4
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.33	54.5	48.5
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.24	70.9	72.7
Knowing the strong and weak points of various crop varieties	3.10	3.44	68.5	66.6
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.17	60.0	57.6
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.20	55.8	57.6
Understanding the value of crop rotation	3.03	3.17	46.1	51.5
Utilizing soil test information	2.92	3.11	61.2	60.6
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.15	57.6	48.5
Identify and correct specific field drainage problems	2.65	2.89	41.8	42.4

APPENDIX F

POULTRY

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Demonstrate a willingness to work	2.84	3.60	26.1	18.2
Demonstrate an ability to work on his own	2.80	3.60	25.5	27.3
Demonstrate the ability to get along with others	2.56	3.30	23.0	18.2
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.33	27.3	18.2
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.44	22.4	18.2

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Maintain lubrication systems (oil, filters, grease)	3.29	3.40	32.7	36.6
Inspect equipment for operating defects	3.23	3.55	40.0	27.7
Service air cleaners	3.20	3.33	28.5	27.3
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.36	35.8	36.6
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.30	42.4	27.3
Install and adjust belts and chains on equipment	3.06	3.27	30.3	55.6
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.33	51.5	45.5
Repack and replace bearings and seals	2.98	3.11	35.8	9.1
Prepare equipment for storage	2.94	3.22	37.6	9.1
Install and service battery	2.89	3.13	26.7	27.7
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.64	44.2	45.5
Replace universal joints	2.76	2.75	37.6	27.3

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Construct and repair fences, gates, doors and pens	3.03	2.78	29.1	45.5
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	3.50	59.4	35.5
Replace valves in water system and replace water pipe	2.80	3.36	35.8	45.5
Adjust, recondition, sharpen, and store tools	2.78	3.00	36.4	45.5
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	3.11	48.5	45.5
Building construction (framing, siding, roofing, etc.)	2.53	2.88	48.5	63.6
Apply wood and metal preservatives	2.53	2.75	33.9	45.5
Mix, cast, finish, and cure concrete, build and remove forms	2.29	2.75	41.8	36.6
Lay brick and block	1.76	2.40	38.8	27.3

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Select market	3.14	3.57	54.5	72.7
Interpret market reports	3.01	2.88	54.5	36.6
Analyze market cycles	2.95	2.86	61.8	36.6
Determine when animals are ready to market	2.85	3.00	35.2	27.3
Sort animals according to size and weight	2.76	3.00	32.7	27.3
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.00	57.6	36.6
Identify characteristics of USDA grades	2.70	3.33	54.5	45.5
Calculate shrinkage	2.67	3.14	40.0	36.6

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Evaluate general conditions of animals	3.16	3.64	36.4	36.6
Select foundation or replacement stock	3.15	2.86	49.1	27.3
Establish production goals for culling purposes	3.12	3.40	48.5	27.3
Keep individual production records	3.09	3.70	46.7	27.3
Inspect animals for desirable traits, characteristics, and defects	3.01	3.00	49.7	36.6
Evaluate the degree various traits and characteristics are inherited	2.92	2.90	53.9	45.5
Keep and evaluate various traits and characteristics and defects	2.86	3.10	45.5	27.3
Identify and evaluate advantages of various breeds	2.86	2.90	43.6	54.5
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	3.00	50.3	45.5
Evaluate influence of consumer demand on type of animal to select	2.65	2.78	39.4	54.5

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Identify symptoms of common diseases	3.39	3.73	66.1	45.5
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.60	43.6	54.5
Select appropriate method to control diseases	3.28	3.64	61.2	36.6
Identify and control internal and external parasites	3.25	3.55	60.0	54.5
Identify symptoms of nutritional imbalance	3.24	3.73	66.1	72.7
Interpret labels on medications and insecticide containers	3.18	3.36	47.9	45.5
Identify sanitation problems which may affect the herd health	3.12	3.36	50.9	45.5
Isolate animals with transmissible diseases and/or injuries	3.11	3.56	39.4	45.5
Work with veterinarians in developing herd health program	2.94	3.10	52.7	54.5
Calculate cost of treatments	2.89	3.27	48.5	63.6
Apply medication to cuts and bruises	2.89	3.17	38.8	45.5
Supply medication through feed and water	2.75	3.55	46.7	36.6
Use insecticide repellants in buildings	2.69	3.45	50.3	45.5

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Determine and balance rations for livestock	3.11	3.36	47.6	45.5
Calculate cost of rations and feed mixtures	3.09	3.55	55.2	72.3
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.10	49.7	72.3
Calculate feed efficiency	2.99	3.73	57.6	45.5
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.50	51.5	36.6
Determine appropriate form and prepare feed mixtures	2.92	3.45	52.1	63.6
Evaluate how ration imbalance may affect production	2.91	3.50	55.2	45.5
Determine how feed palatability may be improved	2.87	3.10	57.5	27.3
Substitute for various feedstuffs in rations	2.82	3.27	51.5	36.6
Interpret feed tags and labels	2.80	3.20	43.0	54.5
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.50	52.1	36.6
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	3.50	34.5	27.3
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	3.00	38.8	45.5
Determine water requirements for animals	2.48	3.11	30.9	36.6
Precondition animals for feedlot or shipping	2.38	2.67	35.2	36.6

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	2.50	25.5	36.6
Identify various causes of breeding difficulty	2.87	3.00	52.7	9.1
Select a breeding method (pasture, AI, etc.)	2.63	2.00	27.9	36.6
Record day of birth	2.45	2.80	20.6	18.2
Determine number of males needed for brood herd	2.36	2.25	17.6	18.2
Record weaning weight	2.19	2.50	19.4	9.1
Use artificial insemination	2.07	1.50	26.7	9.1
Register animals	1.86	2.25	21.2	00.0

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Assist animals in delivering young	3.09	3.29	41.8	9.1
Castrate and dock animals	2.98	3.75	29.1	18.2
Remove manure from quarters and spread it on fields	2.77	3.30	18.2	9.1
Evaluate influence of stress on growth and condition of animals	2.75	3.38	43.6	18.2
Dehorn animals	2.61	3.50	27.3	9.1
Remove dead animals	2.61	3.10	16.4	9.1
Determine space needed for animals	2.51	3.44	23.6	00.0
Isolate newly purchased animals for observation	2.44	3.00	23.0	36.6
Bed animals	2.40	2.67	18.2	9.1
Trim hoofs	2.19	2.33	32.1	00.0
Control waste runoff from feedlots	2.14	3.17	21.8	9.1
Move feeder animals into proper feedlots	1.98	2.33	17.6	00.0
Fit and show animals	1.55	2.00	20.6	9.1

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Identify and correct potential safety hazards	3.33	3.64	49.7	54.5
Properly store and dispose of chemical and inflammable materials	3.24	3.45	42.4	45.5
Read and understand information on labels and signs	3.23	3.36	42.4	36.6
Follow laws relating to chemical usage	3.22	3.36	54.5	9.1
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.55	40.6	36.6
Conveniently locate fire extinguishers in buildings and on equipment	2.99	3.73	41.2	54.5
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.36	42.4	36.6
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	3.83	33.9	45.5
Know and follow EPA regulations which apply to general farming operations	2.56	3.55	49.1	36.6

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Poultry	State	Poultry
Figuring which fertilizer, how much, and when to apply	3.26	3.40	63.6	27.3
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.00	72.7	36.6
Preparing seed bed for planting	3.16	3.20	43.0	9.1
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.40	54.5	18.2
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.20	70.9	27.3
Knowing the strong and weak points of various crop varieties	3.10	3.20	68.5	27.3
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.40	60.0	27.3
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.20	55.8	18.2
Understanding the value of crop rotation	3.03	3.40	46.1	18.2
Utilizing soil test information	2.92	3.20	61.2	27.3
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.00	57.6	27.3
Identify and correct specific field drainage problems	2.65	3.20	41.8	27.3

APPENDIX G

CROPS

Table 1

Personal Employee Attitudes and Competencies

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Demonstrate a willingness to work	2.84	3.63	26.1	22.6
Demonstrate an ability to work on his own	2.80	3.77	25.5	22.6
Demonstrate the ability to get along with others	2.56	3.36	23.0	22.6
Show a positive attitude toward necessary but undesirable tasks related to farming	2.53	3.41	27.3	22.6
Demonstrate the ability to project a desirable image for the farm or farmer he represents	2.47	3.32	22.4	22.6

Table 2

Maintaining Equipment and Vehicles

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Maintain lubrication systems (oil, filters, grease)	3.29	3.68	32.7	41.9
Inspect equipment for operating defects	3.23	3.70	40.0	38.6
Service air cleaners	3.20	3.77	28.5	41.9
Maintain cooling systems (coolant, leaks, thermostats, hoses)	3.18	3.63	35.8	28.6
Maintain fuel systems (filters, carburetors, sediment bowls)	3.14	3.57	42.4	45.5
Install and adjust belts and chains on equipment	3.06	3.53	30.3	41.9
Maintain ignition systems (plugs, wires, timing, points etc.)	3.04	3.60	51.5	51.6
Repack and replace bearings and seals	2.98	3.61	35.8	29.0
Prepare equipment for storage	2.94	3.53	37.6	35.5
Install and service battery	2.89	3.33	26.7	48.4
Maintain electric motors, (clean and oil, install, replace belts and pulleys)	2.84	3.23	44.2	58.1
Replace universal joints	2.76	3.20	37.6	32.3

Table 3

Constructing and Maintaining Buildings and Structures

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Construct and repair fences, gates, doors and pens	3.03	2.93	29.1	45.2
Repair electrical wiring, switches, cords, circuit breakers, fuses and lighting fixtures	2.84	3.21	59.4	55.0
Replace valves in water system and replace water pipe	2.80	2.83	35.8	48.4
Adjust, recondition, sharpen, and store tools	2.78	3.13	36.4	48.4
Repair metal structures with arc welder or oxy-acetylene equipment	2.72	3.08	48.5	35.5
Building construction (framing, siding, roofing, etc.)	2.53	2.79	48.5	45.2
Apply wood and metal preservatives	2.53	2.77	33.9	41.9
Mix, cast, finish, and cure concrete, build and remove forms	2.29	2.69	41.8	29.1
Lay brick and block	1.76	2.29	38.8	29.1

Table 4

Marketing and Shipping

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Select market	3.14	3.45	54.5	54.8
Interpret market reports	3.01	3.39	54.5	54.8
Analyze market cycles	2.95	3.30	61.8	67.7
Determine when animals are ready to market	2.85	3.14	35.2	29.0
Sort animals according to size and weight	2.76	3.17	32.7	41.9
Select appropriate marketing system (futures, contracts, etc.)	2.72	3.50	57.6	67.7
Identify characteristics of USDA grades	2.70	3.93	54.5	58.0
Calculate shrinkage	2.67	3.03	40.0	54.8

Table 5

Selecting Breeding and Feeding Stock

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Evaluate general conditions of animals	3.16	3.20	36.4	25.8
Select foundation or replacement stock	3.15	3.40	49.1	48.4
Establish production goals for culling purposes	3.12	3.20	48.5	35.5
Keep individual production records	3.09	3.35	46.7	45.2
Inspect animals for desirable traits, characteristics, and defects	3.01	3.05	49.7	41.9
Evaluate the degree various traits and characteristics are inherited	2.92	3.00	53.9	32.0
Keep and evaluate various traits and characteristics and defects	2.86	3.20	45.5	35.5
Identify and evaluate advantages of various breeds	2.86	2.85	43.6	29.0
Select breeding system to follow (cross-breeding, line-breeding, etc.)	2.85	3.32	50.3	45.2
Evaluate influence of consumer demand on type of animal to select	2.65	2.95	39.4	25.8

Table 6

Maintaining Herd Health

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Identify symptoms of common diseases	3.39	3.64	66.1	35.5
Vaccinate animals (intra-muscular, intravenous, subcutaneous)	3.32	3.64	43.6	54.8
Select appropriate method to control diseases	3.28	3.36	61.2	41.9
Identify and control internal and external parasites	3.25	3.41	60.0	35.5
Identify symptoms of nutritional imbalance	3.24	3.36	66.1	61.3
Interpret labels on medications and insecticide containers	3.18	3.73	47.9	41.9
Identify sanitation problems which may affect the herd health	3.12	3.23	50.9	41.9
Isolate animals with transmissible diseases and/or injuries	3.11	3.41	39.4	48.4
Work with veterinarians in developing herd health program	2.94	3.19	52.7	58.0
Calculate cost of treatments	2.89	3.20	48.5	51.6
Apply medication to cuts and bruises	2.89	3.24	38.8	45.1
Supply medication through feed and water	2.75	2.95	46.7	29.0
Use insecticide repellants in buildings	2.69	2.83	50.3	32.3

Table 7

Formulating Feed and Feeding

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Determine and balance rations for livestock	3.11	3.63	47.6	45.2
Calculate cost of rations and feed mixtures	3.09	3.42	55.2	29.0
Identify factors that influence the quality of feedstuffs (wet hay, etc.)	3.04	3.33	49.7	48.4
Calculate feed efficiency	2.99	3.37	57.6	38.7
Evaluate the influence the quality of feedstuffs has on the production	2.96	3.15	51.5	29.0
Determine appropriate form and prepare feed mixtures	2.92	3.32	52.1	35.5
Evaluate how ration imbalance may affect production	2.91	3.37	55.2	48.4
Determine how feed palatability may be improved	2.87	3.24	57.5	35.5
Substitute for various feedstuffs in rations	2.82	3.21	51.5	41.9
Interpret feed tags and labels	2.80	3.14	43.0	41.9
Interpret feed analysis reports (to have your feed analyzed)	2.69	3.30	52.1	41.9
Determine when feed additives should be withdrawn from animals (antibiotics stilbestrol, etc.)	2.52	3.00	34.5	25.8
Work with veterinarian and feed salesmen in formulating feed mixture and planning feeding programs	2.49	3.00	38.8	38.7
Determine water requirements for animals	2.48	3.10	30.9	29.0
Precondition animals for feedlot or shipping	2.38	3.00	35.2	25.8

Table 8

Breeding and Record Keeping

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Mark animals for identification (ear tags, numbers, tattoos, brands etc.)	2.89	3.25	25.5	51.6
Identify various causes of breeding difficulty	2.87	3.37	52.7	9.7
Select a breeding method (pasture, AI, etc.)	2.63	3.22	27.9	37.8
Record day of birth	2.45	2.89	20.6	6.5
Determine number of males needed for brood herd	2.36	3.12	17.6	19.4
Record weaning weight	2.19	2.63	19.4	12.9
Use artificial insemination	2.07	2.82	26.7	25.8
Register animals	1.86	2.36	21.2	25.8

Table 9

Handling and Caring for Animals

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Assist animals in delivering young	3.09	3.30	41.8	19.4
Castrate and dock animals	2.98	3.33	29.1	32.3
Remove manure from quarters and spread it on fields	2.77	2.95	18.2	12.9
Evaluate influence of stress on growth and condition of animals	2.75	3.30	43.6	19.5
Dehorn animals	2.61	3.36	27.3	22.6
Remove dead animals	2.61	3.17	16.4	19.5
Determine space needed for animals	2.51	3.06	23.6	28.5
Isolate newly purchased animals for observation	2.44	3.16	23.0	41.9
Bed animals	2.40	2.90	18.2	29.0
Trim hoofs	2.19	2.88	32.1	16.1
Control waste runoff from feedlots	2.14	2.80	21.8	6.5
Move feeder animals into proper feedlots	1.98	3.13	17.6	25.8
Fit and show animals	1.55	1.91	20.6	16.1

Table 10

Observing Legal Practices and Following General Safety Precautions

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Identify and correct potential safety hazards	3.33	3.55	49.7	58.1
Properly store and dispose of chemical and inflammable materials	3.24	3.61	42.4	41.9
Read and understand information on labels and signs	3.23	3.67	42.4	51.6
Follow laws relating to chemical usage	3.22	3.61	54.5	16.1
Wear appropriate and protective work clothing (safety glasses, respirators etc.)	3.06	3.32	40.6	29.0
Conveniently locate fire extinguishers in buildings and on equipment	2.99	3.41	41.2	29.0
Interpret feed additive, mixing and withdrawal laws and regulations	2.73	3.23	42.4	61.3
Know and follow shipping regulations for cattle (brand inspection, health certification)	2.61	3.23	33.9	41.9
Know and follow EPA regulations which apply to general farming operations	2.56	2.70	49.1	32.3

Table 11

Soil Preparation, Planting, Irrigation and Harvesting

Skills	Mean		Percent Needing Training	
	State	Crops	State	Crops
Figuring which fertilizer, how much, and when to apply	3.26	3.83	63.6	74.2
Knowing the various methods of weed control (chemical, mechanical, and biological)	3.22	3.68	72.7	80.7
Preparing seed bed for planting	3.16	3.61	43.0	51.6
Understanding irrigation principles applicable to the specific farming situation (i.e. sprinklers, flood etc.)	3.13	3.70	54.5	67.7
Understanding proper fertilizer usage and recognizing trace element deficiencies or toxicities	3.11	3.83	70.9	87.1
Knowing the strong and weak points of various crop varieties	3.10	3.52	68.5	80.7
Recognizing various types of crop injury (frost, drought, herbicides, insects, or disease)	3.08	3.61	60.0	70.9
Determining soil moisture content and its relation to various soil types, (sand, silt, or clay)	3.08	3.68	55.8	64.5
Understanding the value of crop rotation	3.03	3.60	46.1	51.6
Utilizing soil test information	2.92	3.50	61.2	54.8
Understanding appropriate field trial procedures for new fertilizers, soil amendments, and "soil medicines"	2.71	3.17	57.6	67.7
Identify and correct specific field drainage problems	2.65	3.44	41.8	38.7